Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

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The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
3	Preserved fish	8	Composition
4	Oils	9	Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1953

0.36 POST MORTEM CHANGES IN MEAT AND THEIR POSSIBLE RELATION TO TENDERNESS TOGETHER WITH SOME COMPARISONS OF MEAT FROM HEIFERS, BULLS, STEERS, AND DIETHYLSTILBESTROL TREATED BULLS AND STEERS

Wierbicki, Eugen; Kunkle, L. E.; Cahill, V. R.; and Detherage, F. E. (Departments of Agricultural Biochemistry and Animal Science, Institute of Nutrition and Food Technology, the Ohio State University, and the Ohio Agricultural Experiment Station, Columbus, Ohio)
Food Technology 10, 80-86 (February 1956)

Tenderness and biochemical characteristics of the meat from 32 animals which included heifers, bulls, bulls implanted with diethylstilbestrol, steers, and steers implanted with diethylstilbestrol have been determined at 3 and 13 days post mortem.

No great differences were noted between groups on tenderness at 13 days post mortem although the hormone treatment tended to produce slightly tougher meat at both 3 and 13 days post mortem.

Hydroxyproline values were slightly higher in the meat from the hormone treated cattle.

Intramuscular fat was greatest in steers and heifers and least in bulls and the hormone treated steers yielded less marbled meat. The results on marbling confirmed an earlier report (16) that intramuscular fat appears to be a sex characteristic rather than a mark of tenderness per se.

An earlier report (10) was confirmed that there is no increase in non-protein and trichloracetic acid soluble nitrogen during post mortem tenderization.

Water extractable nitrogen and potassium citrate soluble nitrogen decrease during post mortem aging indicating that dissociation of actomyosin into actin and myosin is not responsible for post mortem tenderization.

Actomyosin is formed during the onset of rigor mortis and this may account for the initial toughening of meat after slaughter.

Juice expressed on cooking decreases on post mortem aging and a significant relation was observed between this factor and tenderness of meat at 3 and 13 days post mortem

(over)

 Author's summary

2.115 FISHERIES AND NAVAL ARCHITECTURE

Traung, Jan-Olof
FAO Fisheries Bulletin 8, 167-197 (October-December 1955)

This article presents several aspects of planning and building fishing boats and stresses the practicality of employing a naval architect who is familiar with the performance requirements of a fishing boat as well as with modern ship design. Nearly all fishing boats built today are constructed without the aid of architectural plans. Hull type and size are therefore not changed from boat to boat as the builder cannot judge the effect of such change. Builders follow rule-of-thumb knowledge accumulated through generations of experience. Often when attempting to duplicate a proven vessel, a builder is surprised to find that the two boats float differently on the water line or that the stability differs.

Subjects taken up in this article with varying degrees of thoroughness include: speed, hull shape, block coefficient, prismatic coefficient, shape of aft body, sharp propeller posts, sea kindliness, propellers, engines and hull construction.

It is difficult to make fishermen and fishing boat builders realize that the cost of employing a fisheries naval architect (5 to 10 percent of the total building cost) would be more than offset by increased efficiency. The tendency now is to put this money into larger engines or fancy accommodations. It is generally and unjustly felt that the design of present day fishing vessels cannot be improved upon.

Some nations (including Norway and Japan) have seen fit to have naval architects included on their Fisheries Department staffs. As a result, not only have stronger and more seaworthy boats been

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 ABSTRACTER: M. R. Greenwood

2.05 THE GROWTH OF FOOD-POISONING AND FOOD-SPOILAGE BACTERIA IN FOODS

Anonymous
Food Preservation Quarterly 15, 62-65 (December 1955)

The control of food poisoning has two separate aspects: (1) the exclusion of the organisms or prevention of contamination and (2) the prevention of growth of bacteria that have gained access to the foods.

Control of contamination.--Contamination is important from both a qualitative and a quantitative point of view. Very few of the many organisms can cause food poisoning and only a relatively few are important spoilage organisms. The Salmonella and Staphylococcus are the two most common types that cause food poisoning. From the quantitative standpoint, the greater the number of organisms present in a product, the shorter is its storage life. Usually spoilage becomes evident when the organism reaches a level of 10^8 or more per gram of product.

The author lists the following measures used to reduce the contamination level: (1) good sanitation, (2) use of easily cleaned equipment, (3) prevention of dust, (4) handling methods that avoid the carry-over of material from previous batches, (5) strict attention to personal hygiene by food handlers, (6) use of equipment to avoid handling of food by human beings, (7) installation of fly screens, (8) control of rodents, and (9) exclusion of sources of infection such as carriers.

Control of growth of organisms in foods.--Factors that affect the growth of organisms include (1) the type of organisms, (2) the chemical and physical properties of the food, and (3) the storage conditions, including temperature. Temperature is the most important factor because it determines

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 ABSTRACTER: David T. Miyauchi

2.115 SOME OPINIONS ON SMALL DRAGGER DESIGN

Chapelle, Howard I.
National Fisherman 36, 13-14, 46 (January 1956)

The factors in design of small craft hull-forms are quite different from those vessels 80 to 100 feet or larger. Small seagoing fishing craft have a very deep draft and great beam in proportion to length. Rather large dimensions are necessary to obtain required displacement while providing desired deck space and accommodations. The increase in steam-bent frame construction has brought about a trend toward somewhat lighter displacement.

Size of small draggers is not strictly determined by the minimum displacement requirement, but rather by cruising range required, by conditions of fishing, and by prevailing rules and regulations affecting some areas where fishing is done. The demand for small draggers is created by three conditions: (1) cost of construction, (2) the small fare and short trip, and (3) the need to operate on foul bottom in some areas. As opposed to larger boats, a small trawler will stop when the gear "hooks up" and rolling while "hooked up" will not put much strain on the gear.

To introduce better designed draggers it is desirable, especially from the fisherman's standpoint, to modify (and only slightly) the form or combination forms of one or two successful boats. It is possible to alter length, depth, or occasionally the beam without changing the form very much.

It is necessary to estimate the "light weight" of the vessel to be built in order to end up with the proper displacement. This is a real problem and usually as much as 10 or 12 percent of the estimated dead weight is allowed as a safety factor. Many times, after the boat has been designed to allow for a certain engine size, fuel tank capacity, trawling gear, etc., specifications (as to weight and location)

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 ABSTRACTER: M. R. Greenwood

POST MORTEM CHANGES IN MEAT

PREVENTION OF FOOD POISONING

FISHING VESSEL DESIGN

SMALL DRAGGER DESIGN

2.05

which organisms can grow and their rate of growth. Bacteria can grow in the temperature range about 20° F. to 160° F., but each organism will grow better within certain smaller temperature ranges. Pathogens have a high minimum growth temperature, so cooling the product to 40° F. or lower prevents the growth of pathogens and food-poisoning bacteria; however, at these lower temperatures other organisms predominate, such as Achromobacter and Pseudomonas, important in chilled-meat storage, and other organisms that cause proteolytic spoilage of milk instead of usual souring.

The higher the temperature within the growth range of an organism, the greater is the possible growth rate. For example, an organism at 40° F. may divide only once in 4 hours but may make 5 or 6 divisions per hour in the high-temperature regions. It is, therefore, highly important to avoid keeping prepared and cooked foods in the higher temperature growth range for a long time before consumption.

The growth of organisms can be controlled by the rapid cooling of foods, by holding foods at temperatures as low as practicable, and by reducing to a minimum the amount and time of handling the food product in the processing line.

2.115

of these items are changed without considering the change in displacement, trim or both. A boat is usually built under at least three contractors (hull, engine, winch and trawl accessories, etc.) who work more or less independently of each other. As a rule the designer hasn't much to say about the construction after the original plans are made.

To insure greater accuracy in the mold loft, the designer can draw plans with level lines (inside the plank) instead of water lines so that fairing is done with sections perpendicular to the keel rabbet. Full ends are not desirable in small draggers. A sharp bow with moderate flare beginning near the light load line and flaring outwardly in a nearly straight line is desirable to allow the vessel to maintain speed in rough seas as well as to hold plunging to a minimum, thus preventing undue spraying which causes severe icing up in the freezing weather. A short and full run at the stern usually results from the necessity of having the engine as far aft as possible to allow for more fish-hold space. This can be cut to a minimum by placing the center of buoyancy on or near the after bulkhead of the fish hold. The sharp "canoe stern" is becoming more popular because of its nominal cost and greater strength over the old tug type stern. It also reduces pounding in following seas.

In all aspects of small dragger design, success in the long run will depend upon the knowledge exhibited in the interplay of technical and economical factors. It is quite useless to produce an "engineering masterpiece" if it cannot be operated economically in its intended area of use -- no matter what would be the result elsewhere.

0.36 (Cross Reference: 2.02)

Post mortem pH changes have been observed which might contribute to increased protein hydration during post mortem aging.

Water and potassium citrate buffer extractable nitrogen, pH, and juice expressed on cooking have been studied from 2 hours to 30 days post mortem. Coincident changes in these factors suggest a close relation to tenderness and support the hypothesis that post mortem tenderization may be an ion-protein or a protein-protein interaction which contributes to increased protein hydration of the cooked meat proteins.

The suggestion is offered that the important qualities of meat-tenderness, shrink on cooking, drip on freezing, and rehydration after dehydration may all be primarily related to the degree of hydration of the meat proteins.

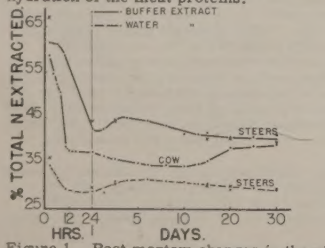

Figure 1. Post mortem changes in the nitrogen extracted by potassium citrate buffer (pH 5.60, 0.22 M. potassium chloride, 0.48 total ionic strength) and by water for two steers and one cow.

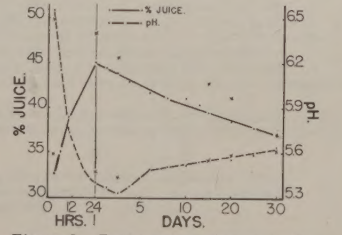

Figure 2. Post mortem changes in juice expressed on cooking and in pH for two steers.

2.115

designed, but also more efficient fisheries tools have been developed. The day should come when it will be as natural to speak of a naval architect as a member of a Fisheries Department in all countries, as it is today to speak of biologists, oceanographers, and economists. The boats, after all, represent the largest single investment in the fishing industry.

2.116 MEASURING CURRENTS AND DEPTH NET FISHES

Anonymous
Fisheries Newsletter (Australia) 14, 9, 11 (December 1955)

Equipment that measures the speed and direction of currents at any depth in the sea has been developed by Dr. S. N. Carruthers of the National Institute of Oceanography in Surrey, England.

The Current Meter

Although the submarine current meter has obvious uses for oceanographic measurements, it was designed primarily for use by fishermen to indicate current conditions at depths where fish may lie. The meter consists of a cone made of metal mesh and is suspended from a rod. The rod is attached to the rope by a corkscrew twist at either end, and fixed in position by a split bobbin that clamps around a rope or wire. The meter cone contains a pendulum and compass assembly that is free to swing when the cone is sent down.

Before the instrument is lowered, the mechanism is loaded with a capsule that dissolves after a suitable interval in water. When this happens, the pendulum and compass cord are clamped into the position they have taken up.

The slope of the cone depends upon the speed of the current. A scale measures the angle between the cone and the vertical pendulum and shows the speed directly in knots. As the cone always heads into the current stream, the compass reading gives the direction of the current.

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 ABSTRACTER: Kathryn L. Osterhaug

2.6 FRESH AND FROZEN FISH CONSUMPTION IN FEDERAL PENAL AND CORRECTIONAL INSTITUTIONS, 1954

Anonymous
Commercial Fisheries Review 17, 27, 28 (December 1955)

The average annual consumption of fresh and frozen fish in 27 institutions studied was 9.95 pounds per inmate. The great bulk of fresh and frozen fish was purchased in the form of fillets. Only a minor part of the purchases consisted of dressed whole fish. The Northeastern area reported the highest consumption per inmate with 13.18 pounds, whereas the North Central area reported the lowest with 8.41 pounds per inmate.

Ocean perch and haddock ranked first and second in quantities purchased. Ocean perch was purchased by more than three-fourths of the institutions and haddock by over one-half.

The average cost per pound of fresh and frozen fish purchased ranged from 19 cents per pound for smelt to 30 cents per pound for mackerel.

See table 1, over.

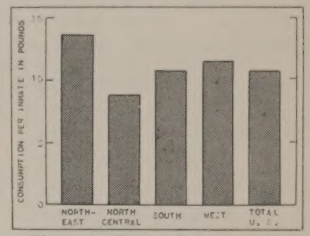

Figure 1. Regional consumption per inmate of fresh and frozen fish in all Federal penal and correctional institutions, 1954.

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 ABSTRACTER: Kathryn L. Osterhaug

2.15 NEW B. C. HALIBUTER TESTS SEA WATER FISH CHILLING

Anonymous
Pacific Fisherman 54, 29 (March 1956)

A 75-foot halibut boat being build in a Vancouver shipyard will be used for the first commercial tests in British Columbia on the use of refrigerated sea water for the transportation and storage of fish.

The boat will be equipped with 100,000-pound capacity tanks built of steel with six coats of a special plastic finish. The refrigeration compressors will be powered by two diesel engines.

Small scale experiments were carried out last year in a 60-foot packing vessel with a capacity of about 40,000 pounds of salmon. The sea water was circulated through the tanks by centrifugal pumps and maintained at a temperature of 30° F. Althought the quality of the fish kept in the tanks was excellent, the experiment did not afford the opportunity of making a really thorough test on a practical scale.

According to Dr. H. L. A. Tarr, who with other members of the staff at the Fisheries Experimental Station in Vancouver, is taking an active interest in the experiments, additional advantages to the use of refrigerated sea water are that the crushing of fish in the hold is practically eliminated and loading and unloading are simplified.

Practical tests have been made in the use of refrigerated sea water in vessels operating out of Seattle, but, apart from a troller with capacity for holding 10,000 pounds of fish, this new development has not been applied to a commercial fishing vessel of substantial size.

 ABSTRACTER: Kathryn L. Osterhaug

3.338 ALUMINUM PLATE, WELDED SEAM FOOD CAN REVEALED

Anonymous
Pacific Fisherman 54, 56 (February 1956)

A food can with an aluminum coating instead of tin, and with sideseams that are welded instead of soldered, has been developed by a United States can manufacturer in the search for tin-free food containers.

The welded sideseams not only eliminate the use of tin and lead solder, but also provide much stronger cans than conventional soldered types, it is explained. They are so strong that under test conditions the steel walls of the cans break before the welded seams separate.

The aluminum coating on both bodies and ends provides a durable and attractive finish that gives even better protection than tin to the outside of cans. The insides of the cans are lined with special enamel coatings especially designed to give added protection to specific canned products.

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OCEAN CURRENT METER

HOLDING FISH IN REFRIGERATED WATER

INSTITUTIONAL FISH CONSUMPTION

ALUMINUM COATED CAN

2.15

3.338

2.116

In use, the meter is made fast to a light anchor and a few trawl floats are attached to the rope to float beneath the surface. A light buoyed line is used as a tell-tale to enable the rope and anchor to be recovered.

In order to determine accurately the depth at which the measurements were made, it is necessary to correct for the slope of the rope. A rope angle gauge, which consists of a pendulum that swings freely between two sheets of transparent plastic kept apart by two soluble tablets, is used for this purpose. When the tablets dissolve, the pendulum is clamped between the plastic sheets by spring pressure and its reading is preserved.

The Rope Angle Gauge

2.6

Table 1 - Fresh and Frozen Fish Purchased By All Federal Penal and Correctional Institutions, 1954

Species	No. of Inst.	Average Pop. of Inst.	Annual Consumption 1/		Annual Cost	
			Total	Per Inmate	Total Value	Average Price
		No.	Lbs.	Lbs.	$	¢/Lb.
ALL FRESH AND FROZEN FISH	27	21,175	210,701	9.95	54,088.52	.26
ALL GROUNDFISH FILLETS (INCLUDING OCEAN PERCH):	26	20,775	159,590	7.68	42,648.16	.27
Ocean perch	21	17,535	70,440	4.02	19,253.52	.27
Haddock	16	12,490	41,180	3.30	11,237.25	.27
Cod	11	9,765	27,235	2.79	7,156.40	.26
Pollock (Boston bluefish)	7	5,730	19,100	3.33	4,650.14	.24
Hake	2	1,140	1,635	1.43	350.85	.21
ALL OTHER FILLETS:	7	7,925	29,180	3.68	6,375.10	.22
Whiting	3	5,175	13,920	2.69	2,722.70	.20
Catfish	1	2,600	6,400	2.46	1,280.00	.20
Mackerel	4	4,700	4,520	0.96	1,336.40	.30
Flounders	3	4,450	2,540	0.57	604.00	.24
Halibut	1	850	1,800	2.77	432.00	.24
ALL DRESSED FISH:	6	7,960	21,931	2.76	5,065.26	.23
Rock cod (rockfish)	3	2,220	8,880	4.00	1,773.80	.20
Salmon	2	2,700	6,246	2.31	1,595.76	.26
Halibut	1	1,400	4,150	2.96	996.00	.24
Whiting	3	3,390	2,135	0.63	590.80	.28
Smelt	1	320	360	1.13	68.40	.19
Drum	1	640	150	0.23	40.50	.27

1/ Market weight.

3.12 A PRELIMINARY STUDY ON THE PRESERVATIVE ACTION OF FURASUKIN AND MILD HEAT IN CANNING BANGOS

Navarro, Olympia B. and Sulit, Jose I. (Bureau of Fisheries, Manila)
The Philippine Journal of Fisheries 3, 35 (January-June 1955)

Experimental packs of bangos (Chanos chanos), a Philippine salt-water fish, were canned with varying proportions of furasukin (5-nitro-2 frualdehyde semi-carbazone) and processed in boiling water at 212° F. for 30, 60, and 90 minutes. The cans were stored at room temperature and examined daily for external indications of spoilage.

On the third day the tops of the control cans were bulged as a result of gas formed in the can. After two weeks, the cans of fish treated with a low concentration of furasukin, 1/70,000 to 1/50,000, and processed for 30 minutes showed indications of spoilage. The remaining experimental packs were normal or unspoiled even after 6 months of storage when examined by bacterial and organoleptic tests.

The results show that furasukin added in the range of 1/20,000 to 1/10,000 or at least 1/50,000 will preserve canned bangos that have been processed for 30, 60, or 90 minutes, respectively, at 212° F.

 ABSTRACTER: Martin Heerdt

3.12 ANTIBIOTICS AND FOOD

Anonymous
Chemical and Engineering News 33, 5368 (December 12, 1955)
Food Engineering 28, 43-48, 194 (January 1956)

The Food and Drug Administration recently permitted the use of the antibiotic chlorotetracycline (aureomycin) as a preservative for uncooked poultry. In permitting the first use of an antibiotic on food, the Food and Drug Administration has modified its 1953 policy.

Food and Drug's new policy is summarized in the amendment to its original policy which stated that foods might be harmfully adulterated by the presence of antibiotics. The amendment reads as follows: "(The) policy will not bar the establishment of safe tolerances for antibiotic drugs in or on raw agricultural commodities.... where suitable evidence of usefulness of the antibiotic drugs and of safety of the residues is available".

Chlorotetracycline is dissolved in the water in which poultry is chilled after dressing. To facilitate the use of chlorotetracycline, it is mixed with salt in minute quantities and with citric acid. The salt acts as a dry diluent. The citric acid dissolves and provides an optimum pH that stabilizes the chlorotetracycline in the chilling water as the poultry is dipped. Chlorotetracycline retards bacterial growth that is responsible for many types of food spoilage and extends the fresh storage life of poultry and other foods markedly.

The Food and Drug Administration tolerance for chlorotetracycline in uncooked poultry is 7 p.p.m. at the time that it is marketed. This tolerance cannot be exceeded in any portion of the bird. No chlorotetracycline remains after the bird is cooked because cooking destorys chlorotetracycline in low concentrations.

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 ABSTRACTER: Martin Heerdt

FURASUKIN IN CANNING

ANTIBIOTIC DIP FOR POULTRY

3.230 COLD STORAGE OF FROZEN PACIFIC OYSTERS (CRASSOSTREA GIGAS) - NO. 1

Osterhaug, Kathryn L. and Andrews, Murray (Fishery Technological Laboratory, Seattle, Washington)
Commercial Fisheries Review 17, 11-14 (December 1955)

Problems that exist in regard to the successful freezing and storage of oysters include the formation of excessive "drip" (free liquor in thawed oysters after freezing), and the development of off-flavors, discoloration, and texture changes during storage. The current investigations are designed to determine the relative importance of these changes and to find practical methods of eliminating or minimizing them.

Laboratory work consisted of (1) a preliminary investigation into factors that may contribute to the formation of drip, (2) a study of the possible value of treating oysters with certain antioxidants, and (3) the development of special techniques for improving the quality of frozen breaded and fried oysters.

Investigations of factors affecting drip included a study of (a) the effect of damage to the oyster meats during shucking, (b) the effect of holding the shucked oysters before freezing, (c) the effect of blowing time or washing of shucked oysters, and (d) the effect of

(over)

Table 1 - Effect of Damage During Shucking on the Amount of Drip Formed on Thawing of Frozen Pacific Oysters

Condition of Oysters	Can Number	Drip	
		Initial 1/	Final 2/
		Percent	Percent
Undamaged	1	2.55	3.72
	2	3.35	4.60
	3	1.77	2.81
	4	2.44	3.64
	5	0.65	1.09
	6	1.05	1.82
	7	2.46	3.72
	Average	2.04	3.06
Damaged (Cut or broken)	11	2.92	4.65
	12	2.19	4.54
	13	1.88	3.76
	14	1.01	2.26
	Average	2.00	3.80

1/ After draining for 2 minutes.
2/ Additional drip due to standing an hour at room temperature and being drained for another 2 minutes.

 ABSTRACTER: Kathryn L. Osterhaug

FREEZING OYSTERS

DRIP FORMATION

3.239 FREEZING THEORY AND PRINCIPLES - CHANGES CAUSED BY FREEZING

Subba Rao, G. N. (Food and Agricultural Organization of the United Nations, Rome, Italy) and Heerdt, Martin (Fishery Technological Laboratory, U. S. Fish and Wildlife Service, Seattle)
World Fisheries Abstracts 6, 21 (September - October 1955)

Drip is defined as that portion of the liquid phase or muscle juice which exudes during or after thawing from cut surfaces of previously frozen muscles. It is measured by natural outflow and/or by absorbing the liquid from sections of minced muscle with absorbent paper or by exudation into a medium such as petroleum ether. The factors which influence drip include: time and temperature of holding the muscle before freezing, freezing rate duration and temperature of frozen storage, thawing rate, storage after thawing, pH of the muscle, osmotic pressure in the muscle by increasing which (by addition of about 1 percent NaCl before freezing) the drip can be eliminated, type of muscle, and species of fish.

Drip is stated to be due in part to structural changes brought about by the formation of ice and in part to the development of denaturation in the proteins which normally tend to hold the water of the muscle. Various opinions concerning the relative influence of different factors on the extent of drip are discussed. Results of recent studies in Australia, New Zealand, and the U. K. indicate that fish muscle which has been frozen rapidly has less drip than those frozen slowly, and the addition of salt to the fish muscle reduced drip.

 Reprinted in part

3.12

Chlorotetracycline treatment for poultry will cost about one-third of a cent per pound of bird and will extend shelf life by 5 to 7 days. The treatment also will make it possible to use a higher scalding temperature for greater ease in picking the feathers without damaging the bacterial resistance of the bird.

3.239

3.12 (Cross Reference: 3.33)

3.230 (Cross Reference: 1.81)

temperature and time of thawing on the amount of drip developed.

The results of these experiments are given in tables 1, 2, and 3. As the work reported was exploratory in nature and based on limited samples, no final conclusions can be drawn.

Table 2 - Effect of Blowing Time on the Amount of Drip Formed in Frozen Pacific Oysters on Thawing

Blowing Time in Fresh Water	Drip	Moisture[2/]
Minutes	Percent	Percent
[1/] 0	1.00	77.25
2½	1.72	78.00
5	2.65	78.30
7	2.28	78.60
10	2.22	79.26
15	4.28	79.98
30	3.71	79.53

1/ Control group.
2/ Moisture content of oysters, after removal of drip, using Brabender Moisture Tester.

Table 3 - Effect of Thawing Time and Thawing Temperature on the Amount of Drip Formed in Frozen Pacific Oysters Upon Thawing

Thawing Temperature Degrees F.	Thawing Method	Thawing Time Hours	Drip Percent	Moisture[1/] Percent
	Series I - Experimentally-Handled Oysters			
34	Still air	42	3.21	78.87
48-52	Still air	25	2.52	78.53
65-70	Air with fan	2½	2.72	77.70
45-47	Water	4	2.79	78.10
110	Water	⅔	3.16	77.90
	Series II - Commercially-Handled Oysters			
34	Still air	29	7.78	76.75
48-52	Still air	24	8.16	75.65
65-70	Air with fan	3½	7.92	76.10
47	Water	4½	6.81	76.00
110	Water	½	6.72	76.00

1/ Moisture content of oysters after removal of drip using Brabender Moisture Tester.

3.231 EQUIPMENT DESIGN FOR QUICK FREEZING

Buehler, Leon
The National Provisioner 133, 141-144 (November 26, 1955)

Some of the types of equipment used directly in the freezing process are:

Contact-type freezers.--In the simplest form, the packaged product is loaded between a pair of refrigerated plates, which are then clamped together. The freezing takes place by direct conduction. In a batch system, a whole stack of plates are used. To make the process continuous, the clamped plates are cyclicly released, the frozen packages are pushed forward and are replaced by a new row of packages, the plates are clamped together, and the new packages frozen. In another type of equipment, the packages are pulled by means of a conveyor through a refrigerated channel with contact on the top and bottom. Contact freezers are quite efficient; outside of the refrigeration system itself, only a small amount of power is used for hydraulically clamping the plates together.

Freezing tunnels.--The product is transported by some conveying system through a room or tunnel where chilled air is blown over the product. The conveying systems differ in design. The simplest forms are slat conveyors or a wire mesh conveyor. In other conveyor systems, baskets are hung from a conveyor chain, or a series of trays run in slides and over cams being pulled through by a conveyor chain. Other types use loose trays which may be loaded into carriers, suspended from a conveyor, or loaded onto buggies which are conveyed or pushed through the tunnel.

Maximum benefit from the velocity imparted to the air may be attained by spacing the packages properly on the conveyors or on the trays and by properly spacing the trays or conveyor chains to eliminate excessive openings for air passages. The best direction of the air flow is determined by the arrangement and spacing of the conveyors or trays. Sometimes it will be advantageous to circulate the air crosswise or vertically through the load. The direction of airflow may be periodically reversed.

(over)

 ABSTRACTER: David T. Miyauchi

3.24 FROZEN SHELLFISH - STORAGE

Hansen, W. E.
World Fisheries Abstracts 6, 35 (November - December 1955)

It has been shown experimentally that lobster meat, which has been frozen uncooked, becomes soft, shrinks and adheres to the shell during subsequent cooking, so that it cannot easily be removed. Boiling prior to freezing eliminates these disadvantages and gives a product more like freshly cooked lobster in taste. In Danish experiments whole shrimps were frozen and stored at -20° C. (-4° F.), packed in cellophane bags. After 4 months, it was found that the quality of shrimps, packed raw, was superior those cooked prior to freezing. After 9 months, however, the situation was reversed, the cooked product now being superior, i.e., similar to the above observations with lobster. The storage temperature was found to be of a great consequence in the storage of frozen lobster; it was inadvisable to store lobster at a temperature as high as -9° C. (16° F.) for any length of time. Lowering of storage temperatures delayed undesirable changes in color and the general character of the frozen lobster meat. The shells of crustaceans provide good protection against undesirable dessication and oxidation of the edible meat. As products which are completely ready-to-eat have the greatest sales attraction, extensive investigations were undertaken to improve the packing and freezing methods for cooked and peeled crustaceans. Danish observations show that shrimp packed in cellophane bags very soon undergo unpleasant changes in color and taste during cold storage; ice crystals inside the bag show the rapid dehydration of the shrimp meat. Packing in more airtight films, e.g., polyethylene and pliofilm, combined with evacuation of the bag before freezing did not result in any substantial improvement. The best results so far have been found with shrimps boiled without salt, quickly cooled, peeled and packed in Cry-O-Vac bags, which are evacuated, closed airtight and "shrunk" by dipping for a moment in boiling water. The quality of shrimps packed in Cry-O-Vac by the above process did not, after 6 months at -20° C. differ appreciably from freshly cooked shrimps.

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3.237 FISH FRIED AND FROZEN

Anonymous
Food Manufacture 30, 437 (November 1955)

Quick frozen fish sticks may increase the consumption of British caught fish to the point where the British people will reverse their habit of eating less and less fish each year. The present downward trend in the use of fish is serious because fish is one of the few staple foods in which the country can be self sufficient. The enormous increase in the popularity of fish sticks in the United States has been referred to as a "revitalizer" of the commercial fishing industry.

In 1954, the United States produced 50 million pounds of fish sticks as compared with a production of 7.5 million pounds in 1953. During the first 3 months of 1955, 18 million pounds of fish sticks were produced.

Market surveys of fish stick consumers have shown that about 30 percent of the consumers eat fish sticks as a substitute for other fish, whereas the remaining 70 percent eat them in addition to their usual consumption of fish and shellfish. The successful sale of fish sticks in America, however, does not mean success in the sale of fish sticks in Britain. Test sales in South Wales, however, showed very favorable results with an immediate demand for fish sticks.

In Britain fish sticks are called fish fingers. These fingers are simply fish fillets that have had every bone removed before they were moulded into compact blocks. The blocks are cut into small uniform portions, that are then battered, crumbed, fried, cartoned, and quick frozen. To prepare the fish fingers for serving they only need to be heated.

(over)

 ABSTRACTER: Martin Heerdt

3.26 FOOD SERVICE BASES PROGRAM ON PORTION-CONTROL; SERVES HOSPITAL MEALS AT BELOW AVERAGE COST

Anonymous
Quick Frozen Foods 18, 181-183 (November 1955)

Frozen portion-controlled meats, poultry, and seafoods, as well as frozen vegetables are enabling a food management service to serve quality meals at a cost below the national average for hospital patients.

This catering service employs dietitians, chefs, the managers, and kitchen help. The equipment belongs to the hospital, but purchasing of food is done with the caterers' funds. The service provides the hospital administration with daily costs of preparing each meal so portion control makes cost analysis easier.

Portion-controlled items can be issued to each kitchen in accordance with amounts needed as predetermined by selective menus checked by the patients. This eliminates food waste as the chef can order wisely and, as a rule, the patient will eat what he selects.

Portion-controlled frozen items help to control food costs: (1) uniformity of portions insures the correct size serving of food, (2) waste in time, labor, space, and equipment is avoided. (3) cooking is simplified -- this simplicity is not only efficient but it insures quality and there is no shrinkage, spoilage, or waste, (4) food is easy to receive and store, and (5) there is a better control of inventory.

(over)

 ABSTRACTER: Thelma S. Rose

QUICK FREEZING METHODS

FISH STICKS IN BRITAIN

FREEZING SHELLFISH

PORTION-CONTROL FOODS

3.237

The popularity of cartoned, ready-to-use, quick-frozen fish has been growing steadily in Britain. In 1954 almost 7 percent of the total landing or 55,000 tons of whitefish were quick-frozen for sale. This is more than twice the amount of whitefish quick-frozen in 1953. Quick-frozen fish fingers are a logical extension of the packaged frozen fillet development in Britain. Objections to fish are usually based on the presence of bones and on the effort involved in cleaning and dressing them. Precooking of fish and freezing them in individual serving-size portions has completely solved this problem of preparation.

3.26

The ease of purchasing, control, preparation, and uniform serving, dollar-wise and pound-wise, will place the use of frozen food far ahead of the use of fresh unfabricated foods plus those processed in hospitals.

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A load may be divided into various smaller sections, and the air circulation can be through the sections in series with a cooling coil between each section. The amount of air needed to limit the temperature rise can thereby be very materially reduced.

Another scheme is to cool the product in stages. The conveyor can carry the warm product into the first section of the tunnel where the air temperature might be +20° F.; later the product would enter another section of the tunnel where the air temperature might be -10° for further cooling and freezing. This scheme of cooling in stages saves considerably on the size of the refrigerating plant and on the power required.

In the freezing of a product, as long as heat is being extracted from the warm material near the outer surface of the package a high air velocity will promote greater heat transfer. As the outer layers become cold, the heat must come more from the interior of the package; furthermore, since the product itself acts as an insulation, less heat will flow to the surface as time goes on. Under this condition, a high velocity air circulation becomes less and less effective. It is therefore desirable to have very rapid air circulation at the warm end of the tunnel and a reduced air velocity toward the cold end.

In choosing air velocities, one must consider such factors as product spacing, packaging type, and package size. For larger packages, or in cases where the product does not properly contact the package, high velocity air circulation may be less effective in reducing the freezing time and it may not pay to have air velocities over 400 to 500 feet per minute.

3.24

The shape of such bags, however, were unattractive and not very handy to store. The technological laboratory of the Danish Ministry of Fisheries has, therefore, undertaken a series of experiments with block freezing of cooked, peeled shrimps, followed by glazing, wrapping in cellophane and packing in cartons. The storage quality of these block frozen shrimps has compared well with that of Cry-O-Vac-packed shrimp.

3.26 THE FROZEN FOOD INDUSTRY -- AS THE HOME ECONOMIST SEES IT

Merriam, Florence
The Canner and Freezer 122, 22-23 (January 23, 1956)

The prime function of a home economics department in a food company is to promote the product it sells.

The home economist can aid in actual production of frozen foods by assisting in quality control studies through taste tests, appearance tests, and tests on the suitability of the product to the ways it should be prepared for serving. This will be reflected in greater consumer acceptance. Her interpretation of packaging in terms of homemaker convenience is valuable. Her technical knowledge will aid in the development of new formulas and the working out of adequate instructions for proper use of the new item. Also, clear, concise instructions on labels avoid needless misuse and consequent criticism of the food. In addition, recipe development to stimulate increased use of foods and to satisfy the homemaker's insatiable desire for new menu ideas is a home economics service.

The home economist has promotional tools which she can use to publicize the results of her work. In addition to direct distribution of recipes via labels, leaflets, and cookbooks there is the indirect publicity channels, i.e., publicity releases to newspapers and magazine food editors, radio and TV broadcasters and other home economists in related food and equipment fields. Also, educational material for use in the schools has an influence on future adults and their parents. Informing brokers, distributors, and sales personnel on the advantage of your product so they can tell a better story will increase sales and satisfied customers.

(over)

 ABSTRACTER: Thelma S. Rose

3.4 WHAT YOU SHOULD EXPECT OF A SMOKEHOUSE

Pircon, L. J.
The National Provisioner 133, 135-138 (November 26, 1955)

Although the smoking of food products is an old practice, the greatest advances have been made within the last twenty years. Primitive races used grass, sage, and aromatic seeds as a source of smoke. The North American Indian built his fire on the dirt floor of a tepee using oak and hickory. Europeans hung the product in the attic which filled with smoke from the open fire below and seeped out through the thatched roof. In the latter part of the sixteenth century brick smokehouses were developed using cold smoke from outside sources. This system remained practically unchanged until about 1905 when steam coils were added to supply heat. By 1928 an air conditioned smokehouse was designed and used for the smoking of fish and two years later a smokehouse of this type was first used at Liepzig, Germany for smoking meat.

A modern air conditioned smokehouse consists of a number of units such as, (1) a room in which hangs the product, (2) an external smoke producer, (3) heater, (4) humidifier, (5) fan, (6) ducts, (7) plenum chamber, and (8) a damper system. The design and kind of materials used is important. Room walls should be of black sheet iron, tile, or stainless steel sheet. The black sheet is cheapest but hard to clean and is subject to rusting. Tile is slow to heat and is hard to clean between the joints due to smoke and moisture. Stainless is easy to clean, corrosion resistant and since thin sheets are sufficient when insulated, the cost is not excessive. When black iron or stainless steel is used, the insulation should be 2 1/2 to 4 inches in thickness. The floor should be pitched slightly to a drain and treated to be acid resistant. Doors should be well gasketed to prevent smoke leakage. Doors should be designed to be opened from the inside in case a worker should be trapped within the smokehouse.

Air conveyor system. (fan, ducts, plenum chamber, dampers)--Two types of fans are in general use. Cage type and propellor type. The former draws air in at the side of the cage and throws it out

(over)

 ABSTRACTER: Lynne G. McKee

3.338 IRON SULFIDE DISCOLORATION OF TUNA CANS

Stansby, M. E. (Chief, Pacific Coast and Alaska Technological Research, U. S. Fish and Wildlife Service, Seattle, Washington) and Pigott, George
Commercial Fisheries Review 17, 34-39 (October 1955)

Tuna is canned in three styles: solid pack having not more than three pieces in the can; chunk pack having several small chunks, and grated or flake pack consisting of small pieces which may be ground to a uniform size or simply small flakes of meat.

During recent years a black deposit of ferrous iron sulfide has sporadically occurred in solid pack tuna. The discoloration is found on the inside surface of the can and is concentrated in the area adjacent to the head space. The discoloration is harmless but unsightly and creates consumer predjudice.

A second type of discoloration may also be found. This is a sulfide staining which forms under the surface of the enamel coating. The sulfide staining is not objectionable as it does not materially affect the sales appeal of the product. These two staining problems are not confined to tuna and may appear to a lesser extent in other protein foods.

A series of investigations on different phases of the problem has been under way to determine the cause of the discoloration. The first study deals with the theory of iron sulfide formation in cans and discusses the various ways whereby iron and sulfur can become available for iron sulfide.

The source of sulfide in cans.--Sulfide may be introduced in various ways such as a spray on fruit or berries, copper or brass equipment in plants, and as spoilage of the raw product proceeds (as in herring, Stansby and Lemon 1941; Sigurdson 1947). The increase of pH as in canned crabmeat will increase iron sulfide formation. Even the thermal processing of canned products has an effect on the formation of hydrogen sulfide where none was present prior to processing.

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 ABSTRACTER: Lynne G. McKee

4.83 TECHNICAL REPORT PROVIDES PROOF THAT FISH-OIL PRIMER COATING PENETRATES RUST

Anonymous
Chemical Processing 18, 112-113 (October 1955)

Results of research work conducted by Battelle Memorial Institute, which are presented in 22-page technical report, show that manufacturer's fish-oil based primer does penetrate rust to the bare steel surface in measurable quantities. The experimental work confirms the value of the primer in forming a firm bond between the bare steel and top coats in cases where only a minimum surface preparation is possible.

In the investigation, a radioactive fish oil was prepared by esterification of C^{14}-labeled glycerol and fish-oil fatty acids obtained by saponification of the original fish oil. This oil was converted into manufacturer's vehicle and blended to yield a radioactive primer coating.

The radioactive product was then applied to rusted steel specimens. Degree of penetration of the radioactive component of the product into the rust layer was determined by a radioactive lapping technique. A measurable amount of radioactivity was detected wherever rust was observed on the steel specimens, thus indicating that measurable quantities of the fish-oil component of primer penetrate rust layer of rusted steel to the bare surface.

See graph, over.

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FROZEN FOOD PROMOTION

TUNA CAN DISCOLORATION

SMOKEHOUSE OPERATION

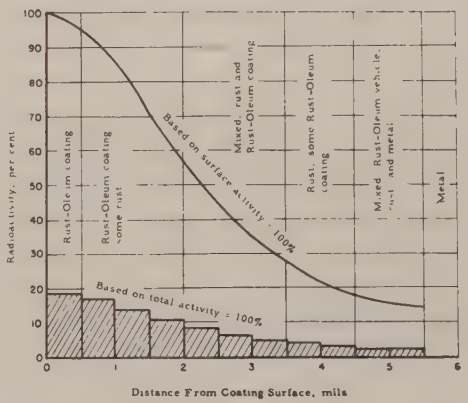
FISH-OIL PRIMER PENETRATES RUST

3.338

Certain factors during and after canning may influence the formation of sulfide. Tuna are usually subject to frozen storage for some time before canning and certain chemical changes may have an effect on the nature of sulfur in the protein. In butchering, if incomplete and certain waste parts remain, the formation of hydrogen sulfide is favored. Precooking removes oil and moisture from the fish and makes cleaning and packing easier. A long precook may tend to drive off more of the volatile constituents including sulfides. The tendency today is to lower the precooking time. Failure to keep the product moving through the plant rapidly will favor the change of spoilage and increases of sulfides. High processing temperatures and time seem to have a bearing on the increase of sulfides.

The source of iron in cans. --Tin protects by mechanical coverage and by the electrochemical protection it gives the iron. Tin is anodic to iron and will go back into solution in preference to iron. Tin plate thickness may range from 0.000015" to 0.0001". This thin coating results in microscopic pores in the tin covering which in turn must be sealed. Synthetic enamels have been developed to give this further protection. Sulfide will not react directly with elemental iron under conditions found in the tin can. By some means iron, which is exposed by minute fractures in the enamel and tin coating, is changed into the active form. Since can discoloration is ferrous sulfide it is likely that the iron must first be converted into an ionic or ferrous state by chemical or electrochemical action. It seems most likely that the ferrous sulfide in the can area adjacent to the headspace is formed by a reaction between the iron from the can in the ferrous form and sulfur from the fish. To determine how ferrous sulfide may be formed in canned tuna several variables will be investigated. These variables include: (1) the condition of the raw fish, (2) temperatures during processing and cooling, (3) salt, oil, and other additives, and (4) commercial packaging and handling techniques. Subsequent papers will discuss the effects of these variables.

4.83



3.26

Through food photography and good copy the home economist assists advertisers. Direct contact through special consumer service activities, i.e., cooking schools, TV and radio appearances, special talks to interested groups and mail answering service gets your story to the prospective customer.

A home economist has a knowledge of the art and science of homemaking and an ability to apply this knowledge to the quality and usefulness of the foods you are selling. In this position, she wins new friends and is helpful to management. Management needs the homemakers viewpoint as efforts are made to develop new and better products.

3.4

around the circumference through the curved blades. Due to the curved blades this type is harder to clean as air-borne material will adhere to the inner side of the blades. The propellor, or axial flow type fan, is more noisy in operation but remains cleaner as the blades throw any deposits off the end of the blades. A hot water and steam ejection system should be provided to clean all surfaces exposed to air-borne material. It is important that the smoke entry not face the air intake as a build up of pressure against the smoke stream will cause smoke to back up into the smoke generator and into the room where it is located.

Smoke generators can be classified in two types. The batch type has the sawdust added as a batch and the fire follows the burning sawdust. The operator must learn to set the drafts to get proper smoke production and the draft must be continually regulated as the exposed grate area changes. This type of smoke generator requires the lowest initial cost. For large installations the continuous feed of sawdust is best adapted. Feed may be by blown air, vibrators, or continuous conveyors. If a smoke density meter is used it is then possible to regulate the rate of feed automatically.

Air conditioning units. --The temperature and humidity of the air is important. Heating of the incoming air can be accomplished with gas or steam. A gas heated smokehouse is easier to keep clean as deposits are burned off. Safety measures with gas must be carefully considered and a means to shut off the flow of gas in case the flame should go out must be provided. The best gas jets available can have the flame extinguished when air velocity reaches 1000 fps. Steam is the cheapest heat source especially where it is needed for other plant purposes. Finned coils should have a greater distance between fins to allow for easier cleaning. Heat and humidity may be controlled through wet and dry bulb thermometers. Humidity may be added to incoming air by steam or by water spray nozzles. The cloth on the wet bulb must be checked to see that the cloth is not fouled with smoke deposits which will cause false readings.

Introduction of conditioned air. --This is best accomplished by blowing through nozzles which are directed from the ceiling towards the floor and along the walls. The incoming air will thus rebound from the floor and in rising the turbulance will cause thorough mixing and the prevention of "paneling" or the air following channels through the smokehouse. The floor and walls should be kept free of any projections which will interfere with free air flow and the air nozzles should be balanced by a similar set on the opposite side of the smoke room. To cut down power consumption all air ducts and nozzles should be streamlined.

3.38 CATALYTIC REMOVAL OF OXYGEN FROM FOOD CONTAINERS

King, J. (Department of the Government Chemist)
Food Manufacture 30, 441-443 (November 1955)

A new British patent, No. 734,197, recently issued to the minister of supply, tells about a method for removing all traces of oxygen from containers in which food is stored. The object of the removal of all of the oxygen is to prevent undesirable oxidative changes in the food in the container.

To quote from the patent, it is a: "Process for preserving substances such as foodstuffs or other substances in sealed containers which comprises removing substantially all the residual free oxygen from the sealed container, whether present in residual free air therein or arising subsequently from air initially occluded in the substance, by introducing hydrogen with the inert gas into the container in the presence of a catalyst arranged in the container before the container is sealed, the said catalyst being one capable of causing hydrogen and oxygen to form water, and thereby converting any residual oxygen into moisture."

One of the most familiar and successful processes for reducing the amount of oxygen in a container is the inert gas-packing method of the powdered milk industry. Milk powder packed according to this method is packed and hermetically sealed in standard tinplate cans with the aid of a can seamer. Then each lid is pierced to provide a small hole for the removal of the entrapped air, and a number of the cans are placed into a vacuum chamber. Air is pumped out of this chamber until a high vacuum results. At this stage nitrogen is fed into the vacuum chamber until the chamber is again at atmospheric pressure. The holes that were made in the cans are now soldered and each can is tested for leaks.

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 ABSTRACTER: Martin Heerdt

4.29 FRACTIONATION AND STABILIZATION OF FATTY ACID CYCLOHEXYL ESTERS BY MEANS OF THIOUREA

Shlenk, H.; Tillotson, J. A.; and Lamp, G. G.
Journal of the American Chemical Society 77, 5437 (October 20, 1955)

The authors report experiments showing segregation and protection against autoxidation by the formation of inclusion compounds of fatty acid cyclohexyl esters by thiourea. The results show the strong resemblance of thiourea to urea. Mixtures of molecules of equal chain length can be fractionated by means of thiourea according to their degree of unsaturation. As with urea, the more saturated components react preferentially.

It was found that the introduction of a cyclohexane ring as an ester group of the fatty acids greatly improved the stability of the thiourea-fatty ester inclusion complexes. It was possible to bind the cyclohexyl esters of the more unsaturated, autoxidizable fatty acids. These adducts are resistant to attack by oxygen.

Their experimental procedure was as follows: cyclohexyl esters of fatty acids were prepared from commercial corn oil and from cottonseed oil by means of alkaline interesterification. The esters boiled at 1 millimeter pressure between 168° and 183° C., the yields being 70 to 80 percent. Thirty grams of corn oil fatty esters were added to a warm solution of 90 grams of thiourea in 900 milliliters of methanol. After cooling slowly and crystallizing at 4° C., the precipitate was filtered and dried. The crystals weighed 56.2 grams and contained 27 percent esters (15.1 grams). An additional 60 grams of thiourea was added to the mother liquor and a second fraction was obtained at 4° C., which weighed 57.7 grams. This fraction contained only 20 percent esters (11.4 grams). The recovery of the esters from the adducts or from the mother liquor was carried out in the same manner as with urea complexes. Data are found in table 1, over.

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 ABSTRACTER: Edward H. Gruger

4.63 THE EFFECT OF INCORPORATING DIPHENYL-P-PHENYLENEDIAMINE (DPPD) INTO A RATION CONTAINING VARIOUS LEVELS OF VITAMIN A FROM FISH OILS

Matterson, L. D.; Bunnell, R. H.; Stinson, Lois Decker; Singsen, E. P.; and Potter, L. M. (Department of Poultry Science, Storrs Agricultural Experiment Station, University of Connecticut, Storrs)
Poultry Science 34, 1080-1084 (September 1955)

Introduction.--The work of Singsen et al. (1955) has shown that diphenyl-p-phenylenediamine (DPPD) is effective in preventing the development of experimentally induced encephalomalacia in the chick. DPPD, which is an antioxidant, has very low solubility in oils, is insoluble in water, and is reputedly unabsorbed by the gut. These properties make DPPD unlike other antioxidants that have been studied for their vitamin E parallelism.

Purpose.--The present study was designed to determine if DPPD has an effect on the utilization of vitamin A from fish liver oils when incorporated into chick rations.

Experimental.--A semi-purified vitamin A-deficient ration that had proved satisfactory in the authors' laboratory for the study of similar problems was used as the basal ration. Two levels of DPPD and seven levels of vitamin A were fed in geometric progression as supplements to the vitamin A-low ration. The 28 chicks fed in each lot were male R. I. R. x B. R. cross obtained from a commercial hatchery. They were not vitamin A-depleted. Five chicks from each lot were sacrificed at 2, 4, and 8 weeks of age for vitamin A analysis of blood and liver. Individual chick weights were made weekly.

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 ABSTRACTER: Martin Heerdt

4.92 NUTRITIVE VALUE OF HIGHLY UNSATURATED FATTY ACIDS AND THE ORIGIN OF TOXICITY OF FISH OILS

Kaneda, Takashi; Sakai, Hisae; and Ishii, Seinosuke
Journal of Japanese Society of Food and Nutrition 7, 1 (1954)

It has been widely accepted that the highly unsaturated fatty acids in fish oils give toxic effects on the growth of rats. In order to prove whether this is true or not, we have carried out the following experiments.

1. When the diet, containing 5 percent of ethyl ester of highly unsaturated fatty acids kept as much as possible from autoxidation, was administered to test rats together with a small amount of vitamins, the normal growth of the rats was attained without showing retarding effects on their health. And the nutritive value of the test ester was not much lower than that of oleic acid used for the comparison.

2. The rats, which were fed with the acids obtained from the same source and autoxidized, exhibited a retarding effect upon their growth with the decrease in weight and the depilation around their mouths, legs, and anuses. They all died in the later course of the test.

3. Moreover, it has been observed that the autoxidized liquid acids of linseed oil cause the same toxicity to the rats.

4. So we fractionated the autoxidized products of linseed oil by urea adduct formation and the nutritive or retarding effects of each fractions are examined.

5. The first fraction separated from the autoxidized products (consisting mainly of unautoxidized esters) does not give any retarding actions to the rats. However, the second and third fractions which

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REMOVAL OF OXYGEN IN CANS

THIOUREA FRACTIONATION

DPPD IN CHICK RATIONS

TOXICITY OF FISH OILS

4.29

Table 1
Fractionation of Fatty Acid Cyclohexyl Esters

Type of esters	Precipitant	Methanol, ml.	Percentage of total esters bound in Fraction 1	Fraction 2	M. L.
30 g. corn oil, I.V. 104	90 + 60 g. thiourea	900	50.4, I.V. 85	38.0, I.V. 121	7.7, I.V. 119
30 g. cottonseed, I.V. 86	90 + 60 g. thiourea	900	48.8, I.V. 58	31.8, I.V. 96	11.3, I.V. 100
30 g. cottonseed, I.V. 86	90 g. thiourea	450	78.2, I.V. 72		18.8, I.V. 115
30 g. cottonseed, I.V. 86	90 g. urea	300	63.2, I.V. 63		30.7, I.V. 123
30 g. cottonseed, I.V. 86	90 g. urea	900	17.1, I.V. 16	8.0[a], I.V. 45	...., I.V. 108

[a]This fraction was obtained by cooling to -10°. The precipitate contained only 3.8% ester.

3.38 (Cross References: 3.64, 3.249)

Cans of spray-dried milk powder packed by this process contained only 0.1 percent oxygen in the headspace gas immediately after nitrogen packing. The oxygen in the headspace, however, increased to about 1.6 percent during the next 24 to 72 hours due to desorption of oxygen by the particles of milk powder. Analysis of several types of commercially packed dehydrated foods has shown that close attention is needed to achieve less than the 2 to 3 percent of oxygen frequently found in nitrogen-packed foods. Experience has also shown that this amount of oxygen is excessive if foods are to be stored for any length of time particularly in a warm climate

One of the first major improvements in inert-gas packing was a catalytic gas purification process whereby the small amount of oxygen normally present in commercial nitrogen was removed catalytically. Commercial nitrogen was made oxygen free by mixing it with the requisite amount of hydrogen and passing the mixture over a catalyst which consisted of palladium suitably dispersed on ceramic granules. The oxygen present was thereby combined with hydrogen to produce an oxygen-free nitrogen with a small amount of residual moisture.

The second major improvement was a nitrogen generator produced by the same company. This generator makes a mixture of nitrogen and hydrogen which contains any desired or predetermined amount of hydrogen ranging between 0.25 and 25.0 percent. By using a suitably balanced mixture of nitrogen and hydrogen it is possible to effect a deoxidizing process in the filled and sealed can simply by placing a catalyst in the can at a suitable stage in the filling process. Any oxygen present is thus converted into moisture which in small amounts is comparatively harmless.

4.92

do not form urea adducts show the toxic effects on the animals. From these results it is apparent that aldehydes have no harmful effect upon the rats.

6. On the other hand, polymerized highly unsaturated fatty acids which contain a small proportion of peroxide show the nutritive effects to the rats and no retarding effect are noticed.

7. Judging from these results, the toxic effects which yield from the autoxidized acids should certainly be attributable mainly to production of peroxide-structure.

8. In order to prove this assumption, we liberated the peroxide of autoxidized highly unsaturated acids or liquid acids of linseed oil by Leas peroxide-determination method. In consequence, peroxide liberated products became not-toxic. On the basis of this result we have come to a conclusion that the most toxic structure in autoxidized unsaturated fatty acids is peroxide which has been produced at the beginning of autoxidation.

9. The lethal dose of peroxide to mice is 278 milligrams total peroxide oxygen per kilogram (LD_{50}). However, the toxic effects of autoxidized oleic acids was slightly lower than that of highly unsaturated acids.

10. The peroxide was found from the liver and meat oil of rats when the autoxidized unsaturated acids were fed, and if the fed fat contained many quantities of peroxide, the peroxide value would become higher than that of control oils.

11. The number of mitochondria separated from the rat livers is decreased when autoxidized fatty acids are added to the mitochondria solution in vitro.

On the basis of these findings, it was concluded that the toxicity of peroxide contained in autoxidized unsaturated fatty acids was produced in the result of injuring the tissues of rats or by destruction of the enzyme systems in their bodies.

4.63

Commercial vitamin A and D oil containing 2,050 international units (I.U.) of vitamin A and 300 international chick units of vitamin D per gram was fed. The total fat content of all the rations was equalized. The antioxidant was incorporated as a dry mix directly into the feed. Kimble's procedure (1939) was used in analysing the blood plasma for vitamin A. Livers were analyzed by the Gallup-Hoefer method (1946) as modified by Bunnell et al. (1954).

Results.--The calculated growth response values based on increasing levels of vitamin A in the feed on an increasing unitage of vitamin A apparently consumed by the chick were plotted. These data appear to level out at 2,400-units with no added DPPD and at 1,200-units with supplemental DPPD. The points of maximum response are found to be 1,635 I.U. of vitamin A per pound with DPPD and 2,445 I.U. of vitamin A per pound without DPPD or a difference of 33.1 percent. The general response of the two criteria of measurement is very similar.

The plasma and liver values for vitamin A at the 2, 4, and 8-week period seems to indicate that DPPD permits better utilization of vitamin A in fish oils in vivo, rather than just the protection of the vitamin A against oxidation during storage. If the better performance of chicks with DPPD is due to protection of vitamin A in the feed, then the heavier chicks at any level without DPPD should have equal or greater liver and plasma levels of vitamin A, provided there is no enhancement of utilization. But the liver and plasma levels of vitamin A are lower without DPPD; therefore, the authors feel that the better storage experienced with DPPD is due to better utilization after consumption and not simply to protection in feed. The effect of DPPD is apparently due to its functioning as a biological antioxidant similar to the action of tocopherols.

6.19 RIBOFLAVIN AND THIAMINE CONTENT OF EGGS FROM NEW HAMPSHIRE AND WHITE LEGHORN HENS FED DIETS CONTAINING CONDENSED FISH OR DRIED WHALE SOLUBLES

Mayfield, H. L.; Roehm, R. R.; and Beeckler, A. F. (Departments of Home Economics Research and Poultry Industry, Montana State College, Bozeman, Montana)
Poultry Science 34, 1106-1111 (September 1955)

Introduction.--The relationship of the breed of chicken to the utilization of certain ration components and the influence of the ration on the vitamin content of the egg has not been studied extensively. In this paper the authors show the effect, on the riboflavin and thiamine content of the egg, of feeding a basal ration supplemented with either condensed fish solubles or dried whale solubles.

Experimental procedure.--Three groups (100 hens each) of New Hampshire and three groups of Single Comb White Leghorn hens were housed separately by group on litter and fed one of the three mash rations supplemented with wheat and oats.

Mash 1 or the control ration contained no condensed fish or dried whale solubles. Mash 2 contained condensed fish solubles, and mash 3 contained dried whale solubles. The riboflavin content of the feeds consumed by the hens was from 6.3 to 8.1 micrograms per gram of ration.

Results.--The various rations did not affect the riboflavin content of the egg. White Leghorn hens, however, laid eggs that contained 4.24 micrograms of riboflaving per gram of whole egg, whereas the New Hampshire hens laid eggs that contained only 3.58 micrograms of riboflavin per gram of whole egg. Eggs from the White Leghorn hens were significantly higher in riboflavin. Eggs from the

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 ABSTRACTER: Martin Heerdt

6.193 THE EFFECT OF FISH MEAL AND ANTIBIOTICS ON THE GROWTH OF CHICKS FED EQUAL AMOUNTS OF FEED

Hill, C. H. and Kelly, J. W. (Department of Poultry Science, North Carolina State College, Raleigh)
Poultry Science 34, 1030-1032 (September 1955)

Introduction.--Coates et al. (1951) and others have shown that the response of chicks to antibiotics is greatest in quarters in which the bacterial population is high. Even in clean quarters, however, Hill and Kelly (1953) have shown that antibiotics will increase growth (1) if fed in high concentration (100 mg./lb. of diet) and (2) if fish meal is also present in the diet (Hill and Kelly 1954).

Purpose.--This investigation was made to determine the effect of fish meal and high levels of antibiotics on the growth of chicks raised in clean quarters on an equalized feed intake.

Experimental.--New Hampshire chicks obtained from a commercial hatchery were used in these studies. The chicks were housed in electrially heated batteries with raised wire floors and supplied with water ad libitum. Twenty birds were used in each lot. The batteries were thoroughly cleaned with hot water and washed with steam prior to use. The walls and floor of the battery room were washed before each experiment, the dropping pans were cleaned frequently, and the water troughs were washed and the water changed daily.

The corn-soybean diet described previously (Hill and Kelly 1954) was supplemented with methionine, all of the required minerals, and adequate amounts of all the known vitamins. When fish meal was added to this ration, the soybean meal in the diet was reduced correspondingly, to maintain equal amounts of protein in all of the experimental diets. Feed intake was equalized in all groups by determining the feed consumption of all groups each morning. The feed was then removed from the group which had eaten the most feed during the previous 24 hours. As each of the other groups consumed that amount of feed, their feed was removed. After the feed intake had been equalized each day, the feed was returned to all of the chick groups.

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 ABSTRACTER: Martin Heerdt

6.19 POULTRY NUTRITION FINDINGS

Couch, J. R. (Texas A & M College)
Feedstuffs 28, 92-93 (February 18, 1956)

Protein requirements.--"Protein Requirements Under Various Laying Conditions", was the title of a paper presented by Dr. George Ingram of Alabama Polytechnic Institute, Auburn, Alabama. According to Dr. Ingram, 7 factors were involved in determining the protein requirement of laying hens. These factors were pen temperature, age of the bird, caged layer versus floor layer management, rate of lay, protein quality of the ration, form in which feed was given (pellets, crumbles, or mash), and energy level of the ration.

Three different experiments were reported upon by Dr. Ingram. The first experiment was concerned with the protein requirements of 50 caged layers over a period of 6 1/2 months. This experiment showed that caged layers require at least 17 percent protein and give their best performance on a 17 to 19 percent protein ration.

The second experiment showed that where egg production and feed efficiency were concerned, a 16 percent protein ration produced results that were almost identical with results obtained by feeding an 18 percent protein ration.

From the third experiment Dr. Ingram concluded that 16 percent protein was adequate under most conditions, but that (1) under conditions of stress such as high temperatures and (2) for highest production, the laying hen requires 900 to 950 calories per pound of ration and 17 to 18 percent protein in the ration.

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 ABSTRACTER: Martin Heerdt

6.193 PRESENT STATUS OF UNIDENTIFIED GROWTH FACTORS IN POULTRY NUTRITION

Morrison, A. B. (Cornell University)
Feedstuffs 27, 41-44 (December 10, 1955)

It has been found that a portion of the growth response obtained when certain unidentified chick factor supplements are fed to chicks is due to their content of an inorganic constituent or constituents, since an appreciable growth response is obtained from the ashed materials.

Available evidence indicates that the growth response obtained from the ash cannot be due to dietary deficiency of nutrients known to be required by the chick. Added levels of all trace minerals known to be required by the chick, alteration of the calcium and phosphorus content of the diet, increased quantities of sodium, potassium or magnesium, or 25 percent additional mineral mixture, had no influence on growth.

Although a considerable growth response was obtained from the neutralized ash of a mixture of unidentified growth factor supplements, or from the neutralized ash of a composite sample of corn distillers dried solubles, our data indicate that the total unidentified growth factor content of both the mixture of five unidentified growth factor supplements and the corn distillers dried solubles cannot be entirely explained on the basis of their inorganic constituents.

 Author's summary

6.19 (Cross Reference: 6.193)

Poultry byproducts.--Dr. H. L. Fuller of the University of Georgia, Athens, Georgia, spoke on the "Use of Poultry Byproducts in Broiler Rations." Dr. Fuller told of comparative tests whereby (1) poultry byproduct meal consisting of poultry meat scraps or poultry offal meal, (2) feather meal, and (3) poultry manure were compared with 5-percent fish meal in a standard broiler ration that contained 870 to 1,002 calories per pound and a calorie to protein ratio of 39-41 to 1.

The poultry manure was made from litter left in broiler houses after broilers maintained on peanut hull litter had been marketed. The poultry manure was autoclaved, dried, ground, and mixed into the feed ration. The byproduct meal, feather meal, and poultry manure were fed for 4 weeks in some experiments and 8 weeks in others.

The results of the feeding tests made by Dr. Fuller showed that 5-percent poultry byproduct meal could be substituted for fish meal as a source of unidentified growth factor or "fish factor" activity in the ration of the growing broiler. Feather meal at the 5-percent level, however, was not equal as a substitute in the ration for the fish meal in the poultry byproduct meal. The dried poultry manure in the ration did not compare favorably with fish meal in the ration.

Energy in broiler rations.--C. E. Richardson and A. B. Watts, Louisiana State University, Baton Rouge, Louisiana, contributed to the meeting with a paper entitled, "The Study of Energy in a Practical Broiler Ration". These men increased the energy level of broiler feed rations by adding cottonseed oil to the formula. Their findings showed that the calorie to protein ratio of a broiler feed formula should be within the limits of 41.5-42.5 to 1. In presenting his data, Dr. Richardson explained that fibrous feeds had a depressing effect on (1) the average gain of the birds and (2) the feed efficiency. Dr. Richardson then presented data to show that the chick could utilize up to 12-percent fat in the ration. The data also showed, however, that the use of more than 6-percent fat as cottonseed oil in the broiler ration was contrary to best economic returns.

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New Hampshire hens that received the various rations were similar in thiamine content. They contained 0.99, 1.00, and 0.98 micrograms of thiamine per gram of whole egg, respectively. Eggs from the White Leghorn hens that received rations containing condensed fish solubles or dried whale solubles were significantly higher in thiamine than were those from hens that received the control ration. These eggs contained 1.17, 1.12, and 1.00 micrograms of thiamine per gram of egg, respectively. Eggs from the White Leghorn hens also were significantly higher in thiamine than were those from the New Hampshire hens.

The results show that the White Leghorn hens utilized more fully than did the New Hampshire hens, some component or components of the rations that contained condensed fish solubles or dried whale solubles. This component was not thiamin; however the component did influence and increase the thiamine content of the egg.

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Three experiments were carried out. In the first two experiments, the birds were allowed to consume feed at the maximum rate which would allow for feed equalization between lots. In the third experiment, the feed intake was controlled as in experiments 1 and 2 except that the chicks were allowed to consume approximately 15 percent less feed daily.

Results.--See table 1, below. A combined analysis indicated that (1) the magnitude of the treatment response was approximately the same for all three experiments and (2) the combination of basal ration with fish meal and antibiotic produced a marked increase in growth over the basal ration, the basal ration with fish meal, or the basal ration with antibiotic.

Discussion.--Under the conditions of these experiments, the growth stimulation was not dependent upon an increased feed intake.

Table 1.--The effect of fish meal and high levels of antibiotics on the growth of chicks fed equal amounts of feed

Diet	Exp. 1		Exp. 2		Exp. 3		
	Av. feed cons, gm./chick	4 wk. wt., gm.	Av. feed cons, gm./chick	4 wk. wt., gm.	Av. feed cons, gm./chick	wk. wt., gm.	Ave. 4 wk. wt., gm.
Basal	660	382(120)	640	383(40)	545	315 (40)	360
5% Fish Meal	660	380(80)	640	375(20)	545	317 (40)	357
Antibiotic[1] (100 mg./lb.)	660	390(80)	640	385(40)	545	313 (40)	361
5% Fish Meal + Antibiotic (100 mg./lb.)	660	402(40)	640	404(40)	545	327 (40)	378

( ) Number of birds per treatment.

[1] Crystalline bacitracin in Exp. 1, Crystalline aureomycin HCl in Exp. 2 and 3

LSD (5%) Ave. of experiments 7.0 gm.

LSD (1%) Ave. of 3 experiments 9.5 gm.

6.3 STUDIES ON THE HETEROGENEITY OF CARRAGEENIN

Smith, David B.; O'Neill, A. N.; and Perlin, A. S.
Canadian Journal of Chemistry 33, 1352 (August 1955)

The carbohydrate residues in κ-carrageenin are 3,6-anhydro-D-galactose and D-galactose which are present in nearly equal amounts. Tests following fractional precipitation of κ-carrageenin indicate general chemical homogeneity but physical heterogeneity. κ-Carrageenin is not susceptible to oxidation with periodate. Fractional precipitation of λ-carrageenin separates a main fraction which contains only D-galactose and a trace of 3,6-anhydro-D-galactose. This polysaccharide is susceptible to periodate oxidation. It is polydispersed on a mass basis. Materials containing glucose, xylose, and L-galactose segregate into minor fractions of λ-carrageenin and hence cannot be integral parts of the principal polysaccharides of carrageenin. L-Galactose has been isolated from carrageenin by a simple procedure.

Authors' summary

6.3 PLANT PROTEINS. V.--PROTEINS AND AMINO-ACIDS OF MARINE ALGAE

Coulson, C. B. (Institute of Seaweed Research, Inveresk, Midlothian)
Journal of the Science of Food and Agriculture 6, 674-682 (November 1955)

Purpose.--The main objective of the present investigation was the isolation of the bulk proteins from the following three classes of marine algae: Chlorophyceae, Rhodophyceae, and Phaeophyceae. These isolated bulk proteins were then examined for their amino acid composition.

Extractions.--Proteins were extracted from three main classes of marine algae including fresh and dry algae. Rhodymenia palmata protein was extracted on a large scale.

Methods of analysis.--Nitrogen, ash, and moisture were determined by methods in general use at the author's laboratory. Protein was determined by the methods of Chibnall, Rees, and Williams with a few modifications. A rapid method of direct estimation on two-dimensional paper chromatograms was used to determine the approximate amino acid composition of four proteins. A preliminary examination was made of the ninhydrin-reactive substances from the ethanolic extracts of dried marine algae and unknown ninhydrin-reactive substances (possibly iodo-amin-acids) in the alkaline hydrolysates of Rhodymenia palmata protein. It is possible that alginate interference is a problem in protein extraction.

Results.--Algal proteins were found to differ very little quantitatively from the proteins of land plants. Table 3 shows the amino-acid composition of isolated bulk proteins of marine algae.

Table 3.--Amino-acid composition of isolated bulk proteins from marine algae (amino-acid content expressed as g. of amino-acid nitroten/100 g. of protein nitrogen)

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ABSTRACTER: Martin Heerdt

6.3 THE COMBINED AMINO ACIDS IN SEVERAL SPECIES OF MARINE ALGAE

Smith, Donald G. and Young, Gordon E. (National Research Council, Halifax, Canada)
The Journal of Biological Chemistry 217, 845-853 (December 1955)

Introduction.--To date only a few analyses of the distribution of the free and combined amino acids in algae have been reported.

Objective.--The authors, therefore, set out to obtain and report additional information on the amino acid composition of marine algae. For quantitative analysis of the combined amino acids of the common seaweeds, they selected Ascophyllum nodosum, Chondrus crispus, Rhodymenia palmata, and Ulva lactuca, which are representative species of three main classes of algae.

Methods used.--All samples of seaweed were collected locally, dehydrated in moving warm air, and powdered in a Wiley mill. To extract free amino acids and simple peptides, 1 gram of the ground weed was shaken with 100 milliliters of 75 percent ethanol. The residue from the extraction was boiled in 20-percent hydrochloric acid for 24 hours in the ratio of 1 gram of dry material to 200 milliliters of acid. Insoluble humin was filtered quantitatively from the acid digest.

After the excess acid had been removed from the filtrate by repeated distillation in vacuo, the filtrate was dissolved in water sufficient to give a concentration of about 1 milliliter of nitrogen per milliliter of solution. This solution was neutralized with silver oxide to a pH of about 4.5 and centrifuged at 5,000 r.p.m. until clear.

Nitrogen was estimated by the micro-Kjeldahl method. Amino acids formed on hydrolysis were determined quantitatively by the ion exchange method of Moore and Stein (1951) and qualitatively by descending paper chromatography. Two dimensional chromatograms were then prepared according to the method of Levy and Chung (1953).

Results.--Tables 1 and 2, over, show the forms of nitrogen determined and the distribution of amino acid nitrogen, respectively.

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ABSTRACTER: Martin Heerdt

6.3 STUDIES ON THE EXTRACTION OF ALGINIC ACID FROM SOME SPECIES OF PHILIPPINE SARGASSUM

Sulit, Jose I. and San Juan, Regina C. (Bureau of Fisheries, Manila)
The Philippine Journal of Fisheries 3, 47-51 (January-June 1955)

Material.--Sargassum, a floating brown algal seaweed, is a universally found marine plant. Nine species of sargassum were harvested at different seasons of the year from various Philippine marine waters.

Harvesting.--The seaweeds were gathered off the coast of Lingayen Gulf and the Hundred Islands in Pangasinan Province, washed with fresh water, and dried immediately in the shade with circulating air to avoid bacterial fermentation.

Extraction of alginic acid.--The procedures involved were based on the conversion of alginic acid to sodium alginate with sodium carbonate and regeneration of the free alginic acid with acid. The alginic acid from each of 5 species was extracted as follows:

1. Leaching: Two hundred fifty grams of the air-dried seaweeds were leached with a dilute solution of hydrochloric acid (0.33 percent) for at least 3 hours. The leached seaweed was washed thoroughly with fresh water, dried, and then cut into fine pieces.
2. Digestion with sodium carbonate solution: The seaweed was chopped, treated with 5 liters of 4 percent sodium carbonate solution, set aside, and maintained at a pH of 9 to 10 overnight. The next day the digested material was homogenized and treated with enough 6 normal hydrochloric acid to completely precipitate all of the crude alginic acid. The alginic acid was then washed with 95 percent alcohol, recovered by filtration, and dried under vacuum. The dark-brown crude alginic acid was washed several times with 95 percent alcohol and dried under vacuum until light-brown in color and amorphous.

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ABSTRACTER: Martin Heerdt

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Alginic acid found.--The alginic acid content of all the species of sargassum studied is quite high (table 3). These species may be used in the production of commercial alginates.

Stabilizing power.--The stabilizing power of alginic acid in the form of sodium alginate was tested with coconut syrup. Coconut syrup heated to 106° C. received varying amounts of alginic acid dissolved in 4 percent sodium carbonate solution. The percentages of alginic acid used were as follows: 0.1, 0.2, 0.3, 0.5, 0.7, 1.0, 1.2, 1.4, 1.7, and 2.0. The stabilized syrups were then transferred to 250 ml. beakers, covered and set aside to be observed for separation.

Stabilizing effect.--Separation of the stabilized coconut syrup did not occur if 0.5 percent or more alginic acid in carbonate solution was present. Coconut syrup, a local commercial product that has found its way into the international market, has a tendency to separate upon storage. The use, therefore, of alginic acid in the form of sodium alginate as a stabilizer is recommended.

Table 3.--Showing the acid contents of some species of sargassum and other brown algae found in Philippine marine waters.

Scientific name	Moisture	Alginic acid	
		Fresh basis	Dry basis
	Per cent	Per cent	Per cent
Sargassum enerve C. Ag.	9.98	25.60	28.44
Sargassum hemiphyllum C. Ag.	8.78	26.00	28.50
Sargassum nigrifolium Yendo	15.18	26.00	28.31
Sargassum serratifolium C. Ag.	10.05	25.20	28.02
Sargassum siliquosum C. Ag.	7.04	26.32	30.65
Turbinaria sp.	9.45	19.00	20.09
Hydroclothrus sp.	10.54	16.70	18.62

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Table 3:

	Rhodymenia palmata (North Berwick, 28/7/53)	Enteromorpha intestinalis (North Berwick, 29/5/53)	Laminaria cloustoni frond, dried (Dunbar, 16/9/53)	Ascophyllum nodosum (S. Queensferry, 19/3/53)
Aspartic acid	3.0	5.2	7.9	8.7
Glutamic acid	2.6	3.7	3.4	5.3
Serine	3.8	1.8	3.2	3.3
Threonine	2.1	2.0	3.1	2.7
Glycine	5.8	4.4	8.5	5.7
Alanine	2.6	5-10*	5.1	5.0
Valine + methionine	4.6†	6.8†	4.4†	14.0†
Leucine	4.7	7.5	5.1	8.7
isoLeucine	†	†	†	†
Phenylalanine	1.2	2.1	1.1	--‡
Tyrosine	1.3	1.2	0.9	0.5
Proline	1.7	3.2	3.9	+ §
Tryptophan	+	+	+	+
Cystine	+	+	+	+
Arginine	5.8	8.5	12.3	11.8
Histidine	1.0	0.8	0.0	0.0
Lysine	3.9	3.7	4.6	4.1
Amide N	---	---	---	---
Total	44.1	50.9	63.5	59.8

*Standard and hydrolysate curves not sufficiently within range. Not included in total.
†Valine and methionine estimated together using valine/methionine (4:1). Similarly with leucine and/isoleucine (10:1).
‡A ninhydrin-reactive spot of lower phenol R was found.
§Too small to measure.

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Table 1.--Forms of Nitrogen in Various Algae

Species	Total N in dry plant	Total N in			Total N estimated
		Ethanolic extract	Humin	Acid hydrolysate	
	per cent	per cent	per cent	per cent	per cent
F. vesiculosus	2.74	24.6	6.4	64.0	95.0
A. nodosum	2.31	33.2	5.5	57.4	96.1
C. crispus	4.36	22.4	1.9	65.0	89.3
R. palmata	2.08	11.4	2.4	76.5	90.3
U. lactuca	3.33	9.4	2.6	68.0	80.0

Table 2.--Combined Amino Acids in Various Algae

The results express nitrogen of the amino acids as percentages of total N in hydrolysate.

Amino Acid	F. vesiculosus	A. nodosum*	C. crispus†	R. palmata‡	U. lactuca*
Alanine	5.4	5.3	3.6	7.9	8.2
Arginine	8.2	8.0	28.0	10.8	10.1
Aspartic Acid	9.0	6.9	3.7	7.2	7.8
Citrulline	0.0	0.0	3.3	0.0	0.0
Cystine	+	+	+	+	+
Glycine	5.4	5.0	3.1	7.5	7.2
Glutamic acid	11.0	10.0	3.4	6.2	6.6
Histidine	1.6	1.3	1.1	1.1	0.8
Isoleucine	3.0	2.8	1.7	3.1	2.8
Leucine	5.0	4.6	2.6	4.6	5.0
Lysine	6.0	4.9	3.3	6.4	5.8
Methionine	0.4	0.7	0.5	0.6	1.0
Ornithine	0.0	0.0	6.3	0.0	0.0
Phenylalanine	2.6	2.3	1.3	3.1	3.0
Proline	3.3	2.6	2.1	3.6	3.4
Serine	3.5	3.0	2.2	4.8	3.9
Threonine	3.3	2.8	2.0	3.9	4.2
Tryptophan	+	+	+	+	+
Tyrosine	1.2	0.9	1.0	1.6	1.6
Valine	3.9	3.7	2.6	5.1	4.9
Ammonia	16.0	14.6	6.9	9.9	7.9
Total	88.8	79.4	78.7	87.4	84.2

*Single determination.
†Mean of three determinations; for aspartic acid, threonine, serine, and proline, mean of five.
‡Mean of two determinations.

6.52 UNDERUTILIZED FISH POTENTIAL INCREASES

Anonymous
Commercial Fisheries Review 17, 33, 34 (December 1955)

The manufacture of pet food and fur-animal feed is developing into an increasingly important segment of the fishing industry. The growth of the pet-food industry is illustrated by comparing the increase in the number of standard cases of pet food (with fish as the basic ingredient) packed in 1947 with the number packed in 1954. In 1947, only 940,000 standard cases (48 pounds each) of pet food was packed; whereas, in 1954, over 4 million cases were packed. The value increased during this period from $4 million to $18 million. The industry packing food for animal feeding has been growing rapidly on the Eastern, Western, and Gulf Seaboards.

The sources of raw materials for animal foods include undersize and unmarketable whole fish from regular fishing operations and trimming from fillet operations.

Prospects are for an increasing demand for suitable protein food for use in animal feeding. For instance, because the fur farmers are having difficulty in obtaining horse meat at reasonable prices their demand for fish products is growing. There is good reason to believe that the demand for fish and fish scraps for animal food will continue to grow.

In recent years net fishermen on Lake Erie and other midwestern waters have reported that as much as 90 percent of their daily catches have been composed of fish having only a marginal market.

An active campaign is now in progress in the Midwest to develop markets for underutilized fish as food for pets and commercially reared fur-bearing animals. The work is being done by the

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ABSTRACTER: Kathryn L. Osterhaug

8.8 DEVELOPMENT OF VOLUNTARY FEDERAL STANDARDS OF GRADE FOR FRESH AND FROZEN FISHERY PRODUCTS

Nolte, Arthur J. (U. S. Fish and Wildlife Service, College Park, Maryland)
Commercial Fisheries Review 17, 22-25 (June 1955)

Voluntary United States Standards are used as a basis for evaluating the quality of a product. They are developed by the Federal Government with the aid and cooperation of producers, processors, distributors, and consumers.

Early in 1954, at a meeting of the National Fisheries Institute, the major producers and distributors of fish sticks requested the U. S. Fish and Wildlife Service to undertake research necessary for the development of voluntary standards for fish sticks.

The Saltonstall-Kennedy Act provided funds for the expansion of this initial voluntary Federal Standards project into the area of fresh and frozen fishery products.

During September 1954, the National Fisheries Institute signed a contract to act as a liaison for Federal-industry joint development and application of standards.

The N. F. I. Fish Stick Subcommittee in conjunction with the Fish and Wildlife Service Technological Section have developed a draft of Proposes Voluntary Standards for Frozen Fried Fish Sticks. These proposed voluntary standards have been sent to interested persons of the fish stick industry for written comment and suggestion.

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ABSTRACTER: Max Patashnik

7.595 DETERMINATION OF BUTYLATED HYDROXY ANISOLE AND PROPYL GALLATE IN FOOD ANTIOXIDANTS

Whetsel, Kermit B., Roberson, William E., and Johnson, F. E. (Tennessee Eastman Company, Kingsport, Tennessee)
Journal of the American Oil Chemists' Society 32, 493-496 (September 1955)

Ultraviolet absorption measurements of antioxidant preparations were used for the direct determination of butylated hydroxy anisole (BHA) and propyl gallate (PG) occurring either alone or in mixtures. Two isoabsorptive points were found at 2321 and 2410 mμ for an isopropyl solution of BHA and PG. At all wavelengths greater than 241 mμ, PG was the stronger absorber with the ratio of absorbances reaching a maximum of slightly over 20:1 in the 252 to 258 mμ region. Average deviations of the absorbances at 232.1 and 241.0 mμ were less than 1 percent for BHA and PG. Neither citric acid nor propylene glycol showed measurable ultraviolet absorption at many times the concentrations possible on the analyses of antioxidant preparations.

Using standard absorbances and calculated standard absorptivities for BHA and PG in isopropanol, equations were derived for the calculation of PG and BHA concentrations alone or in mixtures. The precision of the method was determined by replicate analyses of production samples of antioxidant preparations (table 4 following). The procedures have been used over three years in the quality control of commercial antioxidant preparations to food products.

Table 4, over.

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ABSTRACTOR: John A. Dassow

9.16 EXPERIMENTAL FARMING OF THE SOFT-SHELL CLAM, MYA ARENARIA, IN MASSACHUSETTS, 1949-1953

Smith, Osgood R., Baptist, John P., and Chin, Edward
Commercial Fisheries Review 17, 1-15 (June 1955)

Natural predation on clams up to at least 50 mm. long is a serious problem which will have to be met if clam farming or transplanting is to be economically feasible. Horseshoe crabs and green crabs are the two most serious predators in New Hampshire and northern Massachusetts. Clams can be protected from these predators by covering flats with one-inch mesh chicken wire. In this way both native and transplanted clams can be grown from around 10 or 20 mm. to the market size of 2 inches, or about 50 mm. in two summers. Native clams under about 10 mm. long may or may not survive and grow under the chicken wire. The principal disadvantage of putting chicken wire over the clams is the expense of the wire, which might come to $3 or $4 per bushel of clams. Fences only 10 to 12 inches high with a flange on top may afford adequate protection and be cheaper per acre, but further experiments are required to demonstrate their successful practical application.

Growth of native clams in areas studies is rapid, from plankton stage to market size generally taking only three summers or perhaps a little over two years. One year-class (1952) grew even faster, producing a commercially-diggable crop in two summers, or a little over one year. This was the first year-class in a least 4 years to survive well enough, without protection, to produce good commercial digging. The success of this year-class and the failure of others, that were just as abundant up through the byssus stage, indicates that fluctuations in clam populations are largely natural in origin and may result from things other than fluctuations in the numbers of juvenile or byssus-stage clams.

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FISH FOR ANIMAL FOOD

DETERMINATION OF ANTIOXIDANTS

VOLUNTARY GRADE STANDARDS

SOFT-SHELL CLAM FARMING

7.595

Table 4
Precision of Determinations

Sample	Aver. % BHA	Aver. % PG	Std. Dev. %	No. of Detns.
1	19.70	5.97	0.27 (BHA) 0.20 (PG)	6 6
2	....	20.03	0.23	6
3	19.32	.....	0.32	7

9.16

6.52

Fish and Wildlife Service as part of the Saltonstall-Kennedy program for developing new markets for fishery products.

As a result of the campaign, fur-animal ranchers and pet-food canners are investigating the possibilities of an animal food business utilizing carp, sheepshead, smelt, and similar species.

8.8

Meanwhile the Boston, College Park, and Seattle technological laboratories are accumulating data and information necessary for the application of the proposed voluntary standards for frozen-fried breaded fish sticks. Research is being conducted to replace the subjective tests in the standard with objective tests of quality. In addition, the Service has awarded two research contracts applicable to the standards program: the principal freshness tests for fishery products will be evaluated at the University of Washington, and the development of new objective freshness tests will be carried out at Massachusetts Institute of Technology.

Standardization arises from the basic need and desire of producers, processors, distributors, and consumers for a uniform quality evaluation yardstick as an aid in buying and selling. In order to develop realistic and practical voluntary standards, the cooperation of all groups involved is essential.

At present there are no voluntary standards for fishery products, but the procedures for the issuance of standards and regulations governing grading and inspection and the services rendered will follow procedures in effect for various other commodities such as poultry.

Three types of grading and inspection service will be available: (1) grading of fresh or chilled fishery products at terminal markets and other points; (2) grading of processed and manufactured fishery products in official plants, at terminal markets, and other receiving points; (3) inspection of fishery products in official plants for processing.

Grading and inspection certificates will be issued for products graded. These certificates will be documentary evidence of the quality and condition of the product and will accompany warehouse receipts.

Continuous inspection regulations require that a Government inspector be stationed at the processing plant.

All inspection and grading services will be on a Government fee basis adequate to cover cost of the services.

1.85 HOW TO MAINTAIN QUALITY OF ALASKA FROZEN SHRIMP

Carlson, C. J. and Dassow, J. A. (Fishery Products Laboratory, Fish and Wildlife Service, Ketchikan, Alaska)
Pacific Fisherman 54, 54 (February 1956)

In the past, precooked Alaska shrimp meats were sealed in 1- or 5-pound cans and held in crushed ice for marketing. When prepared and stored in this way, their quality was maintained for only a few weeks at most.

To market shrimp over a longer period, producers began to freeze more of the pack, storing it at approximately 10° F. Unfortunately, by the time the frozen shrimp were a few months old, the meats were likely to develop a very tough texture with a corresponding loss of delicate shrimp flavor.

To determine how changes could be made whereby texture could be improved and storage life increased, the Fishery Products Laboratory at Ketchikan prepared and examined several experimental packs of frozen pink shrimp meats.

The work indicated that adverse texture and flavor changes were affected greatly by the methods of preparation used prior to freezing the shrimp. The initial cook of the raw whole shrimp for 3 or 4 minutes in boiling fresh water, as practiced by the industry, was found to be the most satisfactory.

The second, or brine, cook was found to be the step in which significant changes are made in texture and flavor. Experimental brine cooks were made in which pink shrimp were cooked in a 38° salometer brine (10% salt) for intervals from 1 to 4 minutes, and in a 19° salometer brine (5% salt) for 1 minute. Meats cooked in the 38° brine developed an undesirable tough texture and an excessively salty flavor in direct relation to the cooking time. Meats cooked for 1 minute in the 19° brine were acceptable on the basis of both texture and salt flavor.

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL IX NO 6 PAGE 19
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE ABSTRACTER: John A. Dassow

3.235 METHOD MAINTAINS QUALITY IN CRAB CAKES

Anonymous
Food Engineering 28, 92 (February 1956)

Fresh crab meat for making crab cakes is always available directly from an adjacent picking room of a crab plant located at Tilghman, Maryland. Actually, the plant also produces deviled crabs, deviled crab cutlets, bite-sized deviled crabs, fresh frozen oysters, breaded frozen oysters, and fish sticks.

Plant procedure.--Crab processing starts with the weighing in of the barrels of live crabs as they are unloaded from the fishing boats. Crabs are emptied from the barrels into large metal baskets which are lifted with an electric hoist and conveyed to the cooking tanks. After the crab have been cooked in boiling water the baskets are lifted from the tanks of water and conveyed over to a large stainless steel table. The cooked crabs are emptied from the baskets onto this table to cool and drain. When cool, they are transferred to tables in the picking room. Women seated around the tables shake the crabmeat from the shell into pans, see figure 2, over. At intervals these pans are emptied onto a white belt that conveys the meat across an inspection table illuminated with ultraviolet or "black" light. As the meat travels under this light particles of shell that are mixed in with the meat will fluoresce and appear to be purple in color against the white colored crabmeat. Women on both sides of the table detect and remove the shell particles. The picked crabmeat is now ready for packing into fresh market containers or manufactured into crab products.

Crab cakes.--Crabmeat for deviled crab is mixed with a seasoned sauce, and the mixture or blend is put through a machine that molds the deviled crab into cakes of a desired size. The cakes are then machine breaded or coated first with a batter and then with a breading compound and discharged into pans containing breading compound. Each cake is then inspected for complete breading. Crab cutlets are made in special molds that are of a shape that resembles a veal cutlet.

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COMMERCIAL FISHERIES ABSTRACTS VOL. IX NO. 6 PAGE 19
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE ABSTRACTER: Martin Heerdt

2.114 MECHANICAL NET LIFTERS SPEED FISHING OPERATIONS

Mosher Fred D. (Crossley Co., Erie, Pennsylvania)
National Fisherman 37, 17, 33 (February 1956)

Fishing has gradually evolved from a completely manual operation to one that is partially mechanized. Mechanical handling of fishing gear not only reduces hand labor, it increases production and enables the fishermen to perform tasks that would otherwise be extremely difficult or even impossible.

On the Great Lakes the gill netters have converted almost entirely to mechanical net handling. By the end of 1955, more than 95 percent of all gill nets on the Great Lakes were being handled by mechanical net lifters. Production per boat has increased two or three times, and larger nets are handled.

The first mechanical net lifters, manufactured at the turn of the century, were steam-driven. Used only on large boats, these machines were heavy and bulky with many moving parts. They were considered major equipment.

Modern net lifters are equipped with an independent drive featuring a compact, air-cooled engine that uses regular gasoline as fuel. The construction is lightweight, and the net lifters are designed to operate under all weather conditions and regardless of vessel speed. Maximum power necessary for their operation is not over 8 h.p. The largest lifters weigh approximately 1,100 pounds, but those weighing about 700 pounds are used in the smaller boats of 20 to 30 feet.

In modern net lifters, the line or net is brought inboard over a roller at the rail, and is placed in a groove of a rotating head. This head, rotating inboard, grasps the line with spring loaded, cam actuated grips. The action draws the net, fish, and corks or floats over the roller and through a pan that partially encircles the rotating head. After pulling the net, fish, and other gear to a point just beyond the pan, the grips open automatically and drop the netting, fish, and gear into a fish or net box.

(over)

COMMERCIAL FISHERIES ABSTRACTS VOL IX NO. 6 PAGE 19
UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE ABSTRACTER: Kathryn L. Osterhaug

3.238 RED COLOR HELD AND SHRINK AVERTED ON PLASTIC-DIPPED CUTS

Anonymous
National Provisioner 134, 31-32 (January 14, 1956)

A new plastic dip coating process has been developed in California for use in frozen meat packaging. The coating is completely transparent. It does not affect the natural color of the meat and prevents shrinking.

Advantages.--The coating has the following advantages: (1) it is transparent, (2) meat color is retained, (3) prevents shrinking, (4) eliminates need for trimming after storage, (5) enzymatic tendering process continues in coated meats, (6) transmits oxygen, (7) does not transmit moisture, (8) durability is excellent, not brittle even at -40° F., (9) prevents freezer burn, and (10) colorless, odorless, and tasteless.

Cost.--The cost of coating a primal cut is between 3/4 to 1 cent per pound. The cost of applying the coating on fresh meats will be approximately 2 cents per pound. Approximately 1 ounce of material is required per pound of retail cut. The price of the plastic material is not stated.

Application.--The meats are dipped into the liquid plastic at normal cutting room temperatures (45° to 55° F.). A foil band with an eyelet is attached to the cut to facilitate dipping. For proper protection and build-up of the coating three coats are required. The process could be adapted to a conveyor system.

The foil band is used to peel the coating from the cut. The meat must be slightly thawed to permit easy removal of the plastic.

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COMMERCIAL FISHERIES ABSTRACTS VOL. IX NO. 6 PAGE 19
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE ABSTRACTER: R. W. Nelson

2.114

A commercial fishing crew operating a gill lifter in waters of Lake Superior.

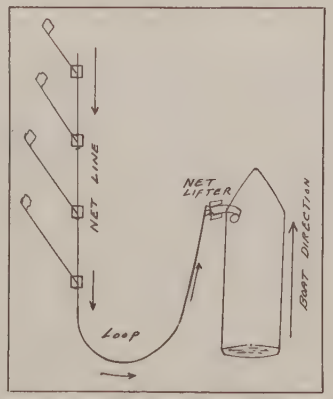

Diagram of gill net lifting with loop system, in which boat is operated parallel to the set.

3.238

The coating has been used successfully on beef, pork, veal, and sliced luncheon meats. It has MIB approval for use on primal cuts intended for holding and on frozen retail cuts.

1.85 (Cross Reference: 3.230)

The quality of frozen shrimp meats was also affected by the method of packaging and by the temperature at which the packaged meats were stored. In order that these variables could be tested, brine-cooked shrimp meats were packed in sealed containers in the following ways: (1) packed dry and sealed without vacuum, (2) packed dry and sealed under high vacuum (18" to 20"), and (3) packed wet by flooding the meats with 2% brine (by weight).

The dry packs were divided into two groups--one being stored at 0° F. Samples were removed for examination at intervals during a 31-week storage period.

As toughening is closely associated with off-flavors and color changes, the quality was judged largely by a determination of the comparative texture, flavor, and color of the samples.

Both vacuum and flooded packs were superior in keeping quality to the packs without vacuum, the former packs having a storage life of 2 to 3 months longer than the latter. Packs stored at 0° F. were superior in keeping quality to packs stored at 10° F., the former packs having a storage life at least 1 month longer than the latter.

Observations on weight loss of cooked shrimp meats indicated that weight of meats decreased as the time of brine cooking was increased.

The final conclusion was that if each step in processing, packaging, freezing, and storing were carefully controlled, the appealing color, the tender crisp texture, and the delicate flavor of Alaskan pink shrimp would be retained by the frozen product for at least 9 months.

3.235

The molded cakes are packed in waxed cartons, which, when filled, are automatically overwrapped and sealed. Institutional size packs are wrapped and sealed in uncolored waxed paper, whereas retail size packs are wrapped and sealed in multi-colored aluminum foil. Wrapped packages go directly into the -20° F. freezer room.

Figure 2.--Cooked meats are removed from shells and placed in cans. Filled cans are weighed and packed in ice for shipment to the fresh market, or transferred directly to adjacent processing room.

0.12 WATER CONE CLEANS AIR OR GAS EFFLUENT

Anonymous
Chemical Engineering 62, 240, 242 (February 1955)

(Abstract of this article appears under 6.135 page 15 - April 1955)

0.5 THE ISOLATION AND DESCRIPTION OF TWO MARINE MICROORGANISMS WITH SPECIAL REFERENCE TO THEIR PIGMENT PRODUCTION

Hodgkiss, W.; Liston, J.; Goodwin, T. W.; and Jamikorn, M.
J. gen. Microbiol. 11, 438-450 (1955)
Food Science Abstracts 27, 505 (September 1955)

Isolates from the skin mucus of Arctic cod included 2 coryneform organisms; A 1032 may be a new species, and A' 1062 is a strain of Corynebacterium erythrogenes. Both strains contained 3 carotenoid pigments, neoxanthin, sarcinaxanthin, and a new pigment, characterized by an extremely high absorptive power when chromatographed, and named corynexanthin.

1.01 FISHING BOATS OF THE WORLD

Traung, Jan-Olof
Fishing News, Arthur J. Heighway Publications Ltd., 107 Fleet Street, London, E.C. 4, England, 579 pp. (1955)

(Abstract of this article appears under 2.11 page 3 - March 1956)

1.70 CHEMICAL NATURE OF THE SHARK FIN FIBER

Tsuchiya, Yasuhiko and Nomura, Tadasi
Tohuko J. of Agricultural Research (Tohuko Univ., Sendai, Japan) IV, 43-53 (October 1953)

(Abstract of this article appears under 8.51 page 17 - January 1955)

1.79 COMPONENT FATTY ACIDS OF MARINE FISH LIVER OILS

Pathak, S. P. and Suwal, P. N.
Journal of the American Oil Chemists' Society 31, 332 (August 1954)

(Abstract of this article appears under 4.15 page 19 - February 1955)

1.82 SOFT-SHELL CLAM DREDGE ALLOWS SUSTAINED PRODUCTION

Anonymous
Commercial Fisheries Review 17, 28-29 (February 1955)

(Abstract of this article appears under 2.1128 page 1 - July 1955)

1.85 NEW TRAWL OFFERED INDUSTRY

Anonymous
Southern Fisherman 15, 74-75 (June 1955)

(Abstract of this article appears under 2.1121 page 3 - November 1955)

1.89 A BOLSTER FOR THE LOBSTER

Anonymous
Modern Refrigeration 58, 291 (August 1955)

(Abstract of this article appears under 2.43 page 9 - December 1955)

1.86 KEEPING QUALITY OF CHILLED DUNGENESS CRAB MEAT IN HERMETICALLY-SEALED METAL CONTAINERS

Carle, Louise A. and Kyte, Lydiane
Commercial Fisheries Review 17, 12-14 (February 1955)

(Abstract of this article appears under 2.01 page 1 - July 1955)

3.249 THE MICROBIOLOGY OF CURED AND FROZEN FISH

Shewan, J. M.
Symposium on cured and frozen fish technology, Swedish Institute for Food Preservation Research, Göteborg, No. 100, Chapter 2, pp 1-18 (November 1953)

(Abstract of this article appears under 0.5 page 1 - December 1955)

3.26 PORTIONED FISH IS OFFERED IN FIVE SIZES

Anonymous
Frosted Food Field 21, 32, 33 (October 1955)

(Abstract of this article appears under 3.236 page 7 - February 1956)

3.33 EXPERIMENTS WITH THE ROTOCLAVE IN PRACTICE

Rievel, H. and Reuter, H.
Fleischwirtsch 7, 169-173 (1955) (Summary in English)
Food Science Abstracts 27, 490 (September 1955)

Extensive trials of the rotatory autoclave technique for canning meat products have deomonstrated that the quality of the canned meats, as judged by flavor and appearance, was markedly improved. Cans withstood incubation for 4 weeks at 37° C., even when contaminated with heat-resistant spores, whereas those retorted by normal methods swelled within 5 to 10 days under similar conditions.

4.7 OILSEEDS, FATS AND OILS, AND THEIR PRODUCTS 1909 - 1953

Banna, Antoine
U.S. Department of Agriculture, Agricultural Marketing Service, Washington, D. C., Statistical Bulletin No. 147 (June 1954) 234 pp

4.81 FRYING OILS AND FATS FOR FISH STICKS

Woods, Lyle C.
A talk presented before the New England Fish Technologists' meeting on February 15, 1955

(Abstract of this article appears under 3.237 page 7 - November 1955)

4.82 USE OF VITAMIN A IN FORMULA FEEDS ANALYZED

Wilgus, H. S.
Feedstuffs 27, 18, 20, 22-24 (May 28, 1955)

(Abstract of this article appears under 4.90 page 11 - October 1955)

6.134 (Cross Reference: 3.61)
FLEXIBLE SPRAY DRYER INTRODUCED

Anonymous
Food Packer 36, 32 (November 1955

6.138 PHOTOCHEMICAL ENGINEERING

Doede, C. M. and Walker, C. A.
Chemical Engineering 62, 159-178 (February 1955)

(Abstract of this article appears under 6.4 page 17 - June 1955)

6.192 THE EVALUATION OF WHALING BYPRODUCTS AS FEEDING STUFFS

Carpenter, K. J.; Ellinger, G. M.; and Shrimpton, D. H.
Journal of the Science of Food and Agriculture 6, 296-304 (June 1955)

(Abstract of this article appears under 6.190 page 17 - December 1955)

6.237 STUDIES ON THE CONCENTRATION OF LIVER OILS. I. AND II. APPLICATION OF PAPER CHROMATOGRAPHY FOR SELECTING SOLVENT.

Funaki, Loemon and Inagaki, Makoto
Bulletin of the Japanese Society of Scientific Fisheries 20, 726, 731 (1954) (English summary, tables, and figures)

6.237 STUDIES ON THE ECONOMICAL MANUFACTURE OF VITAMIN A CONCENTRATE FROM FISH LIVER OIL. IV. ESTERIFICATION OF VITAMIN A CONCENTRATE 1. ACETYLATION AND PALMITYLATION WITH ACID CHLORIDE

Kinumaki, Toyosuke
Bulletin of the Japanese Society of Scientific Fisheries 20, 1027 (1955) (English summary and tables)

6.3 MANUFACTURE OF ALGAL CHEMICALS. VII. THE ISOLATION OF ALGAL CARBOHYDRATES BY MEANS OF CHARCOAL COLUMNS

Black, W. A. P.; Dewar, E. T.; and Woodward, F. N.
Journal of the Science of Food and Agriculture 6, 754 (December 1955)

Charcoal columns have been examined as a means of separating D-glucose and L-fucose obtained on acid hydrolysis of brown seaweeds. Glucose and fucose can be isolated on the one-gramme scale from synthetic mixtures and from hydrolysates of appropriate seaweeds on a column (46 x 5.0 cm.) with water as eluant; but difficulties are encountered on scaling up the process. Demineralization of mannitol-salt mixtures and the isolation of laminaribiose from partially hydrolysed laminarin can also be effected on charcoal columns.

6.55 STUDIES ON UTILIZATION OF FISH WASTES I. AND II. ON PRESERVATION WITH CEREALS, THEIR OFFALS AND SAWDUST (1) and (2)

Simidu, Wataru; Hibiki, Sigeyuki; and Nakagosi, Akiko
Bulletin of the Japanese Society of Scientific Fisheries 21, 131, 134 (1955) (English abstract, figures, and tables)

6.55 ANNUAL REPORT TO THE DANISH FISHING INDUSTRY

Anonymous
Arsberetning fra Fiskeriministeriets Forsogslaboratorium for 1954, 32 pp (1955)

(Abstract of this article appears under 3.30 page 11 - January 1956)

6.86 PHYSICO-CHEMICAL STUDIES ON THE SKIN AND LEATHER OF MARINE ANIMALS. XIII. SWELLING OF SHARK SKIN (2). XIV. DEGENERATION OF THE VEGETABLE TANNED SHARK LEATHER DUE TO HCl

Takahashi, Toyo-o
Bulletin of the Japanese Society of Scientific Fisheries 20, 1110 (1955) (English abstract, figures, and tables)

Shark skin swelling in alkaline solution, acid solutions, and the effect of liming on swelling in the acid solution were studied.

7.00 EXTRACTS AND ENZYMIC HYDROLYSATES FROM FISH LIVER AND MAMMALIAN LIVER

Guttmann, A
Journal of the Fisheries Research Board of Canada 12, 637-645 (September 1955)

(Abstract of this article appears under 6.29 page 15 - March 1956)

7.8 POSITIONAL BIAS IN SENSORY ASSESSMENTS

Harries, J. M. (Scientific Adviser's Division, (Food), Ministry of Agriculture, Fisheries and Food, London
Food Technology 10, 86-90 (February 1956)

A tendency to choose the central sample of three as the odd one in triangular tests, noted by Harrison and Elder has been confirmed, and a similar phenomenon is shown to exist in the "two-out-of-five" tests used in the Ministry of Agriculture, Fishereis and Food. In the latter, this bias is at least considerably reduced by circular presentation. A similar bias is also found when samples are scored according to a pre-arranged arbitrary scale, and one method of allowing for it is discussed.

7.8 DETERMINATION OF THE AGING OF FISH BY MEANS OF IODOMETRIC TITRATION II.

Truttwin, Z.
Z. Lebensmitt.-Untersuch. u.-Forsch., 99, 461-464 (1954)
Food Science Abstracts 27, 509 (September 1955)

Iodine titration values previously established for cod (see Vol. 26, Abstr. 1743) were also obtained for plaice, shellfish, and whiting. The method was further simplified.

7.80 A SIMPLIFIED VARIABLES TASTE PANEL METHOD FOR DETECTING FLAVOR CHANGES IN VEGETABLES TREATED WITH PESTICIDES

Kramer, Amihud and Ditman, L. P. (University of Maryland, College Park, Maryland)
Food Technology 10, 155-159 (March 1956)

The method, based on the analysis of variance from the range eliminates a large part of the computations but nevertheless retains the greater part of the efficiency of a variables method. Results with five products indicate that this simplified variables method was superior to an attributes method such as the triangular tast : test detecting flavor differences.

7.81 BIOCHEMICAL STUDIES ON OCTOPUS. I. TRIMETHYLAMINE TRIMETHYLAMINE OXIDE CONTENT OF OCTOPUS

Asano, Motokazu and Sato, Haruo
The Tohoku Journal of Agricultural Research V, 191-195 (December 1954)

(Abstract of this article appears under 8.8 page 17 - January 1956)

7.89 THE EXPRESSIBLE FLUID OF FISH FILLETS. II. METHOD OF DETERMINING

Banks, A.
Journal of the Science of Food and Agriculture 6, 282-286 (May 1955)

(Abstract of this article appears under 7.593 page 19 - December 1955)

8.4 THE FAT AND WATER CONTENT OF HERRING

Brandes, C. H.
Symposium on cured and frozen fish technology, Swedish Institute for Food Preservation Research, Göteborg, No. 100, Chapter XII (November 1953)

(Abstract of this article appears under 8.53 page 17 - October 1955)

8.51 (Cross Reference: 6.86)

PHYSICO-CHEMICAL STUDIES ON THE SKIN AND LEATHER OF MARINE ANIMALS. XII. THE CONTENT OF HYDROXYPROLINE IN THE COLLAGEN OF DIFFERENT FISH SKINS

Takahashi, Toyo-o and Yokoyama, Wakichi
Bulletin of the Japanese Society of Scientific Fisheries 20, 525 (1954)

A direct relationship exists in fish skin and terrestial animal hide, between the hydroxyproline content of the collagen and the shrinkage temperature (s) of the skins.

8.51 THE FREE AMINO ACIDS OF FISH POST MORTEM CHANGES IN STERILE SKELETAL MUSCLE OF NORTH SEA CODLING (GADUS CALLARIUS)

Hodgkiss, W. and Jones, N. R.
The Biochemical Journal 61, p iv (September 1955)

(Abstract of this article appears under 1.5 page 3 - March 1956)

8.51 STUDIES ON MUSCLE OF AQUATIC ANIMALS. XXIII. DISTRIBUTION OF EXTRACTIVE NITROGENS IN BLOODY MUSCLE

Endo, Kinji and Simidu, Wataru
Bulletin of the Japanese Society of Scientific Fisheries 21, 127 (1955) (English abstract and tables)

The moisture, total nitrogen, and trimethylamine oxide nitrogen are less in amount in bloody muscle.

8.6170 VITAMIN A IN FISH MEAT. II. VARIATION IN THE VITAMIN A CONTENT IN FISH MEAT BY THE BODY SIDE

Hirao, Shuichi; Yamada, Juami; and Kikuchi, Ryô
Bulletin of the Japanese Society of Scientific Fisheries 20, 736 (1954) (English summary, tables, and figures)

In flatfishes, the vitamin A content in meat of the eyed sides are higher than that in the blind sides.

8.6179 BIOASSAY OF FAT-SOLUBLE VITAMINS. II. BIOLOGICAL DETERMINATION OF VITAMIN A IN WHALE-LIVER OILS

Kakayma, Akihiko
J. Sci. Research Inst. (Tokyo) 44, 162-170 (1950)
Chemical Abstracts 44, 9025 (1950)

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Journal of the Science of Food and Agriculture
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Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Fisherman
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Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
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Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

8.84 THIAMINE AND RIBOFLAVIN CONTENT IN THE TISSUES OF SOME SALT-WATER FISHES IN BOMBAY

Pradhan, Vidya and Chitre, R. G. (G.S. Med. Coll. Bombay)
Indian J. Med. Sci. 5, 645-648 (1951)
Chemical Abstracts 46, 2702 (March 25, 1952)

8.8 THE EFFECT OF ICED AND FROZEN STORAGE UPON THE TRIMETHYLAMINE CONTENT OF FLOUNDER (PAROPHYRS VETULUS) MUSCLE

Good, Charlie M. and Stern, Joseph A.
Food Technology 9, 327 (July 1955)

(Abstract of this article appears under 2.01 page 3 - February 1956)

9.11 SURFACE CURRENTS AND OCEANOGRAPHICAL CONDITION IN THE NORTHERN PACIFIC SALMON FISHING GROUND

Taguchi, Kisaburo and Hirose, Yutaka
Bulletin of the Japanese Society of Scientific Fisheries 20, 576 (1954) (English summary, table, and figures)

A survey of ocean surface current was carried out with a current meter by a salmon factory ship in the west Aleutian and southeastern Kamchatka regions from mid-May to early August, 1953.

9.11 MID-PACIFIC OCEANOGRAPHY PART VI, HAWAIIAN OFFSHORE WATERS, DECEMBER 1949 - NOVEMBER 1951

McGary, James W. (Pacific Oceanic Fishery Investigations, Honolulu, T. H.)
Special Scientific Report: Fisheries No. 152

9.11 THE CONTRIBUTION OF OCEANOGRAPHIC RESEARCH TO FISHERIES SCIENCE

Kesteven, G. L. (Fisheries Division, FAO Rome) and Deacon, G. E. R. (National Institute of Oceanography, Wormley, Surrey, England)
Food and Agriculture Organization Fisheries Bulletin 8, 67 (April - June 1955)

9.11 (Cross Reference 7.42)

THE ANALYSIS OF SEA WATER - A REVIEW

Barnes, H.
The Analyst 80, 573 (August 1955)

159 references.

9.12 MARKING OF SHRIMP

Menzel, R. Winston
Science 121, 446 (March 25, 1955)

(Abstract of this article appears under 1.85 page 3 - August 1955)

9.14 NECESSITY OF A FEW IMPORTANT AMINO ACIDS FOR FISH

Hanaoka, Tasuku
Nogaku 1, 301-306 (1947)
Chemical Abstracts 44, 2612 (1950)

9.15 EVALUATION OF CHEMICALS USED IN CONTROL AND TREATMENT OF DISEASE IN FISH AND FROGS CAUSED BY PSEUDOMONAS HYDROPHILA

Kaplan, Harold M. and Light, Llewellyn (Southern Illinois University, Carbondale, Illinois)
Am. J. Vet. Research 16, 242-244 (1955)
Chemical Abstracts 49, 8511 (June 25, 1955)

Commonly used antibacterial agents inhibited Pseudomonas hydrophila in pure culture. Higher concentrations produced more rapid and certain results. Because of toxicity to frogs, novosan, PhOH, and Ca $(OCl)_2$ were found to be useful only for sterilization of tanks. Affected fish and frogs could remain immersed for effective treatment with antibacterial concentrations of $CuSO_4$, formalin, $KMnO_4$, $HgCl_2$, and tricresol.

9.15 MEASURING THE TOXICITY OF EFFLUENTS TO FISH

Herbert, D. W. M.
The Analyst 80, 898 (December 1955)

9.15 EFFECTS OF SUGAR MILK EFFLUENT ON FISH LIFE

Dunstan, D. J.
Fisheries Newsletter 14, 15, 23 (May 1955)

9.16 BRACKISH WATER FISH FARMING

Thomson, J. M.
Fisheries Newsletter 14, 13 (March 1955)

9.17 FISH MODELS IN MUSEUM

Anonymous
Trade News 7, 3 (March 1955)

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2.3 NEW FILLETING MACHINE

Anonymous
World Fisheries Abstracts (July-August 1954)

A new filleting machine for flat fish, is reported to fillet over 100 fish the size of a large Dover sole per minute. The machine is 7 feet long and 2 feet wide, completely self-adjusting, and handles fish up to 18 inches wide and 4 inches thick without sorting or manual adjustments. Meat recovery is said to be greater than the average by-the-hand method, with a further saving around the nape. In operation, the fish are placed on a feeding conveyor equipped with an automatic beheading device which, after beheading, carries them to the intake end of the filleting machine in the tail-first position. Both the fillets are removed at the same time and emerge from the discharge end on to a conveyor. The internal parts of the machine are water lubricated and the machine (weighs 600 pounds without the conveyor) is run by a 2 h. p. motor.

3.33 (Cross Reference: 1.20)

CANADIAN SARDINE CANNING

Dewberry, Elliot B.
Food Manufacture 30, 372-376 (September 1955)

A summary of sardine canning practices used on the east coast of Canada and in Maine.

4.21 OXIDATION OF UNSATURATED COMPOUNDS. I. THE OXIDATION OF STYRENE, II. REACTIONS OF STYRENE PEROXIDE. III. PRODUCTS OF THE REACTION OF INDENE AND OXYGEN; STEREOCHEMISTRY OF THE ADDITION OF A PEROXY RADICAL AND OXYGEN TO A DOUBLE BOND. IV. THE EFFECT OF OXYGEN ON THE DECOMPOSITION OF α, α'-AZODIISOBUTYRONITRILE AND BENZOYL PEROXIDE IN AROMATIC SOLVENTS

Miller, A. A.; Mayo, F. R.; and Russell, Glen A.
Journal of the American Chemical Society 78, 1017, 1023, 1035, 1044 (March 5, 1956)

8.66 INVERTEBRATES AS SOURCE OF VITAMINS OF THE GROUP D

Vendt, V. P.
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8.8 A CHEMICAL STUDY ON JELLIED MEAT OF SWORDFISH

Tsuchiya, Yasuhiko and Tatsukawa, Yoshio
Tohoku Journal of Agricultural Research IV, 239 (March 1954)

Jellied meat caused by the growth of Chloromyxum contains a large amount of moisture with relatively small amount of fat and a large proportion of water soluble nitrogen, especially amino acid nitrogen. It may be considered as one kind of disordered meat, because the volatile basic nitrogen are below 20 milligrams percent and the pH value is 5.7 to 5.8. Jellying of the meat is primarily due to the actions of cathepsin or some other similar enzymes partially aided by the collaboration of bacterial trypsin.

9.14 NUTRITION OF RAINBOW TROUT: FURTHER STUDIES WITH PRACTICAL RATIONS

McLaren, Barbara A.; Keller, Elizabeth; John, D.; Donnell, G.; and Elvehjem, C. A. (University of Wisconsin, Madison, Wisconsin)
Trans. Wisconsin Acad. Sci. 40, Pt. 1, 259-266 (1950)
Chemical Abstracts 45, 9758 (November 10, 1951)

9.2 THE MARINE INSURANCE PROBLEMS IN THE FISHING INDUSTRY

Kahn, Richard A.
Fishing Gazette 70, 138, Annual Review Number (1954)

9.2 RESEARCH IN ECONOMICS UNDER THE SALTONSTALL-KENNEDY ACT

Kahn, Richard A.
Southern Fisherman 15, 18, 19 (August 1955)

(Abstract of this article appears under 2.6 page 11 - December 1955)

9.2 YEARBOOK OF FISHERY STATISTICS, PART I. PRODUCTION AND CRAFT

Anonymous
Food and Agricultural Organization of the United Nations IV, Part 1, Rome (1955) 249 pp.

(Abstract of this article appears under 1.01 page 3 - December 1955)

9.3 INTERNATIONAL LAW COMMISSION'S NEW DRAFT CODE FOR HIGH SEAS FISHERIES

Anonymous
Fisheries Newsletter 14, 13 (November 1955)

9.3 PROPOSED STANDARDS FOR FISH STICKS

Anonymous
Fishing Gazette 72, 44-45, 68 (March 1955)

(Abstract of this article appears under 3.236 page 5 - July 1955)

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Anonymous
Pacific Fisherman Yearbook Number 1956 54, 70 - 79 (January 25, 1956)

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